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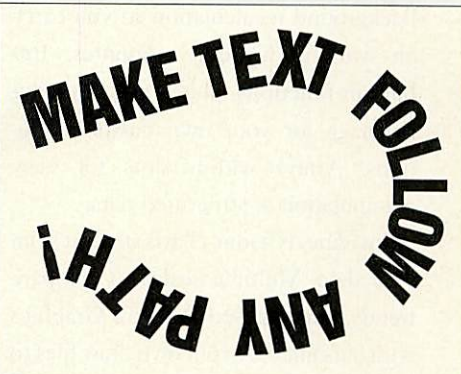
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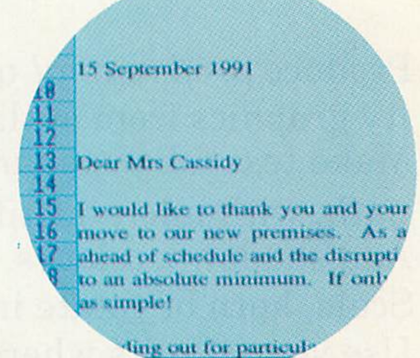
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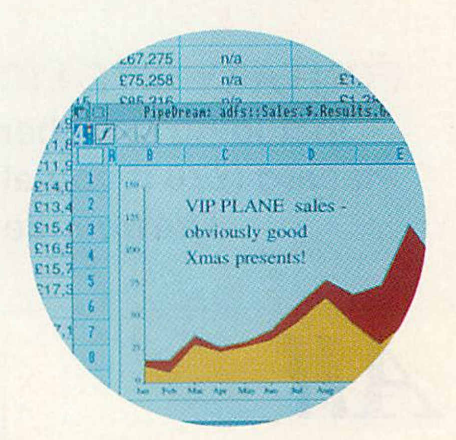
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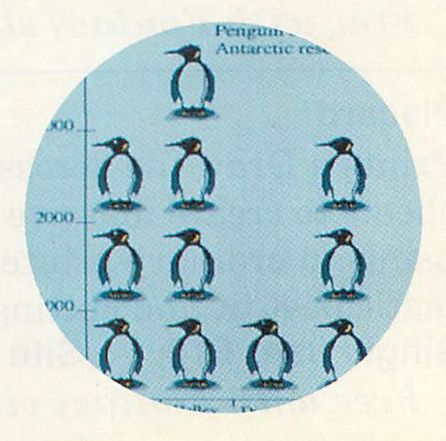


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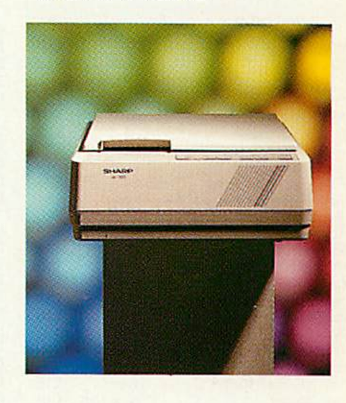
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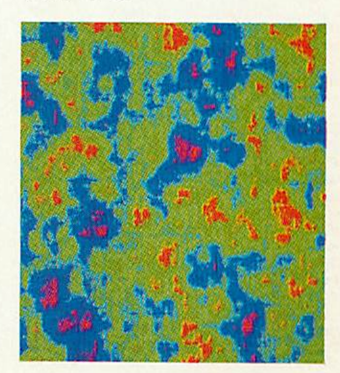
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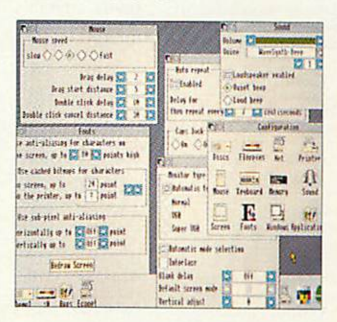
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A310 4 Mb soldered + MEMC1a ‡	*IFEL*	£225
– as above + fitting		£277
– as above + fitting + OS3 carriers		£298
A5000 4 Mb Upgradable †	*Atomwide*	£109
ARM3 ‡	*Atomwide*	£249
Dongle Dangle with screw fittings	*ICS*	£6
4-slot 4-layer Backplane	*IFEL*	£59
A310 RISC OS Carrier Board ‡	*IFEL*	£25
A300/400 Fan kit	*ICS*	£15
Fan filters (set of 10)	*ICS*	£4
Whisper Fan Quietener	*ICS*	£15

MICE, MONITORS

Clares Micro Mouse	*Clares*	£26
9060S	*Eizo*	£450
9070S	*Eizo*	£640

SCANNERS, DIGITISERS

ArcScanner including Epson GT-4000	*Clares*	£1660
FaxScan	*Spacetech*	£94
FX9600AT + Maintenance	*Amstrad*	£376
Hawk V9	*Wild Vision*	£199
– A3000 version	*Wild Vision*	£278
Image (colour)	*Irlam*	£589
Image Scanner	*Iota*	£389
– Colour upgrade	*Iota*	£98
i-Scan 200	*Irlam*	£539
i-Scan 400	*Irlam*	£589
Scan-Light A4	*CC*	£346
– with Sheet Feeder	*CC*	£431
Scan-Light Junior	*CC*	£165
– A3000 internal	*CC*	£165
Scan-Light Junior 256	*CC*	£199
– A3000 internal	*CC*	£199
Scan-Light Professional	*CC*	£840
– as above + SCSI interface	*CC*	£940

I²C PRODUCTS

AnDi Oddule	*Baildon*	£49
I²C Adaptor (needed unless you already have an I²C socket)	*Baildon*	£10
I²C SWI (enhanced IIC_Control)	*Baildon*	£15
– bought with Oddule		£5

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Seal 'n Type (spill-proof)		
– Archimedes	*Kador*	£14
– A3000	*Kador*	£14

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Pack of 10		£10

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CARRIAGE IS FREE WITHIN MAINLAND UK IF YOU PAY ON ORDERING. Remember this when you compare prices!

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Credit cards are welcome. We do not charge your account until your order has been fulfilled. The name and address for delivery of goods should be as known to the credit card company. If you are leaving an order on our answering machine please include your telephone number, the expiry date of your card, and your calculation of the total payment due.

Official orders are welcome. Payment is due in 14 days. Invoices are subject to carriage and late payment charges.

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All products, prices and specifications are offered in good faith and are subject to change without notice. Your order will receive our attention immediately, but suppliers sometimes keep us waiting. Goods are guaranteed but we do not supply them on approval.

Thinking IDE?

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NEW LOW PRICES

➤ A3000 INTERNAL 40 MB – ONLY £399 !

20 MB £225 • 60 MB £549 • 80 MB £675

All with power save, write protect, I²C connector, etc
Miniature fan option for fully upgraded A3000s

➤ A3000 EXTERNAL 40 MB – ONLY £369 !

With power supply and metal case to hold two hard discs

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We offer a full range of internal and external hard disc upgrades and separates. Telephone for more details and friendly advice based on a year's experience in selling IDE products.

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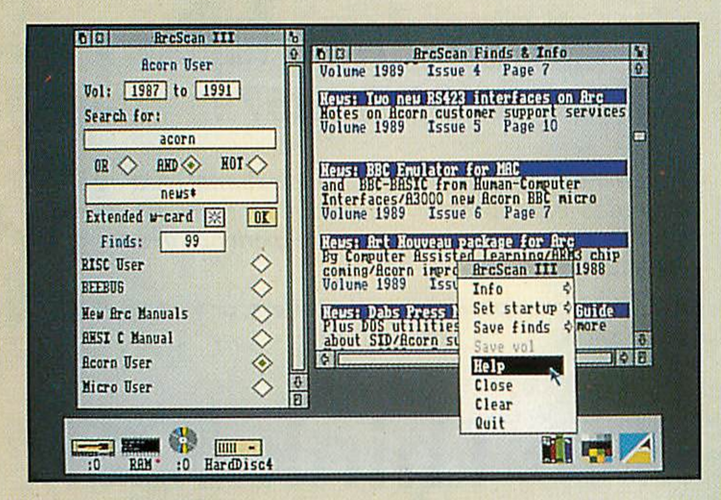
Everything you wanted to know in *Acorn User* at your fingertips!



ArcScan III

the fully customisable all-purpose reference finder for books, magazines and manuals

ArcScan III
is a complete multi-tasking indexing system for the Archimedes which provides rapid access to all references in **Acorn User, from January 1987 to date.** This covers the entire life of the Archimedes, which was launched in June 1987.



The index to Acorn User can be easily updated by the user to include the latest issues.
Regular updates are also available from RISC Developments (see details below).

Some of the features ArcScan III offers:

- provides flexible keyboard search on any entry
- search logic - choice of 3 logical operators: OR, AND and NOT
- finds are displayed in a fast scrolling Wimp window allowing you to browse through all entries retrieved
- features dynamic memory management, returning unused memory to the Wimp
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ArcScan III complete package is available for £24.95 inc VAT
Consists of ArcScan Program Disc, Library Disc (containing indexes for Acorn User and Micro User) and manual
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Already in use by thousands of Archimedes users.

ArcScan III
includes not only the index to Acorn User, but all references for

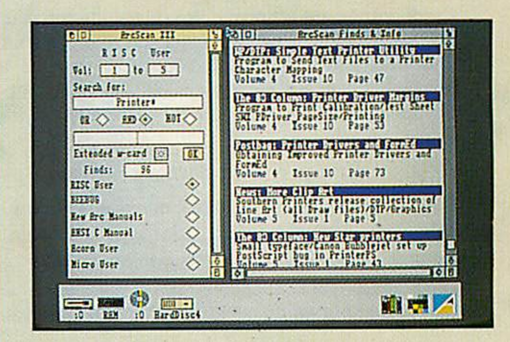
Micro User (January 1987 to date)
RISC User (November 1987 to date)
BEEBUG (1982 to date)

and also
fully computerised indexes to the following major Archimedes manuals:

- RISC OS User Guide
- RISC OS Basic Manual
- RISC OS Programmer's Reference Manual
- ANSI C Manual (Release 3)
- Acorn Fortran Manual

ArcScan III is fully customisable

Arcscan can be used for indexing magazines, journals or books, and is ideal for creating a computerised reference library.
New databases can be easily added and updated on regular basis.



RISC Developments Ltd
117 Hatfield Road, St Albans,
Herts AL1 4JS.
Telephone 0727 40303
Fax 0727 860263



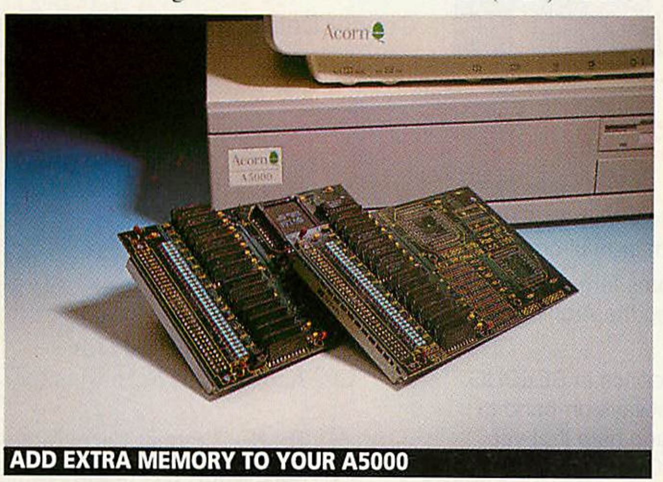
UPGRADES BOOST A5000 MEMORY

TWO COMPANIES – Atomwide and Risc Developments – have already released separate Ram upgrades for the new Acorn A5000.

Atomwide's 4Mb card is offered as a first-stage upgrade to the A5000's standard 2Mb, bringing the total memory up to 4Mb. The card can be further upgraded to 8Mb.

The 4Mb upgrade can be fitted by users and involves no soldering or expert knowledge. However, the upgrade from 4Mb to 8Mb requires the user to send the A5000 to Atomwide for fitting. The cost includes courier collection and delivery. The 4Mb card costs £110 plus VAT and the 4Mb to 8Mb card costs £399 plus VAT. Contact Atomwide, 23 The Greenway, Orpington, Kent BR5 2AY. Tel: (0689) 838852.

Risc Developments' 2Mb Ram card also upgrades the standard A5000 2Mb memory to 4Mb. The card measures 104 x 80mm and can be fitted by users in about 15 minutes. It costs £109 plus VAT from Risc Developments, 117 Hatfield Road, St Albans, Herts SL1 4JS. Tel: (0727) 40303.



ADD EXTRA MEMORY TO YOUR A5000

EMULATOR UPGRADES

CONFUSION about upgrading to Acorn's new *PC Emulator* has prompted new guidelines from the company.

There are two emulator 1.70 upgrades. The AKA48 emulator is for users of MS-Dos. Version 1.7 differs from version 1.60 in that it runs on the new A5000 computer. Apart from this, the only difference is that some minor enhancements have been made to improve the way that some Dos applications run. Upgrading from 1.60 costs £15, while upgrading from earlier versions costs £29.

The AKA45 emulator is for users of DR-Dos, which is supplied with the Learning Curve. In addition to version 1.70 of the emulator, this upgrade also includes DR-Dos 5.00, which is a major step forward from version 3.41, supplied with the Learning Curve. The price is £39 and is said to be higher because it includes the DR-Dos 5.00 licence fee. Prices exclude VAT.

To obtain your upgrade, send your original emulator disc with a cheque made payable to Acorn Direct to: PC Emulator 1.70, Acorn Direct, 13 Dennington Road, Wellingborough, Northants NN8 2RL.

'THE WORST IS OVER'

REDUCED funding for education as a result of the Gulf War contributed towards Acorn's financial losses in the first half of this year, according to the company's half-year financial report.

In what it describes as 'the most difficult trading environment in the UK economy for several years', Acorn Computer Group PLC made a net loss of £420,000 in the first six months of this year, compared with a net loss of £242,000 for the same period last year.

Sales revenue was down to £17.8 million (£22.1 million last year) and the operating profit was £118,000 (£361,000 last year). Interest expenses, related to the build-up in working capital, in late 1990 to early 1991, accounted for the net loss. The group's indebtedness had risen to £9.7 million by the end of December 1990, reflecting the build-up of stock last year as the recession began to bite. The company placed emphasis on converting stock and debtors to cash, reducing the debt to £5.9 million by June 30 this year.

Acorn now claims an installed base of 150,000 32-bit Risc machines. Figures released in June by the independent research company, IDC, showed Acorn to be the fifth largest supplier of computers in the UK, with Acorn computers in 90 percent of schools in the UK.

Acorn's managing director, Sam Wauchope, said that despite the difficult trading period, sales this summer had exceeded those in previous years and that the company's new products – including the A5000 machine launched at this year's *BBC Acorn User* Show – had been extremely well received.

Sam Wauchope added that Acorn would continue its policy of controlling overheads and introducing new products in order to 'face its future with confidence'. The general feeling at Acorn is that the worst is over.

WORKSTATION KEEPS TRACK RECORDS

A NEW bio-mechanics workstation, developed to help athletes analyse and improve upon their movements, has been developed by Salford College of Technology.

The workstation – consisting of an Archimedes, a video frame-grabbing card and a Super VHS video recorder – can be used to analyse athletes' movements and show them how to enhance their performances.

The system, which took the team at Salford three years to design, allows qualitative analysis to be presented in a format that is easy to understand. Although expensive – the complete system costs around £8000 – it is said to be around one-third of the price of anything currently available.


THE ARC'S SHAPING UP

As well as helping to revolutionise athletics training, the system also has potential for the care and rehabilitation of disabled people, placing heavy emphasis on reliable and accurate analysis. It is currently being used by physiotherapists to evaluate limb function and injury treatment.

Top sprinter John Regis, a founder member of the Acorn-sponsored Chafford Hundred Athletics Club, visited Salford College recently to try out the machine. For further information about the system, contact Graham Covell, Salford College of Technology, Frederick Road, Salford M6 6PU. Tel: 061-736 6541.

BEEBUG The Archimedes Specialists

A3000 Hard Drive DTP System

If you have been thinking of getting an A3000 there has never been a better time.

This special offer provides an excellent system ready for immediate use. The hard drive, RAM and Ovation are all installed ready so you can simply turn on and start.

Ovation is the highly acclaimed package combining word processing and DTP. Widely used in education it offers a whole host of features and is powerful and yet simple to use.

Our high speed IDE drive was designed especially for the A3000. It has an access time faster than ST506 or 8 bit SCSI, features auto-parking and sleep mode and is fitted in the internal expansion slot.





- Acorn A3000 Computer
- Genuine Acorn Colour Monitor
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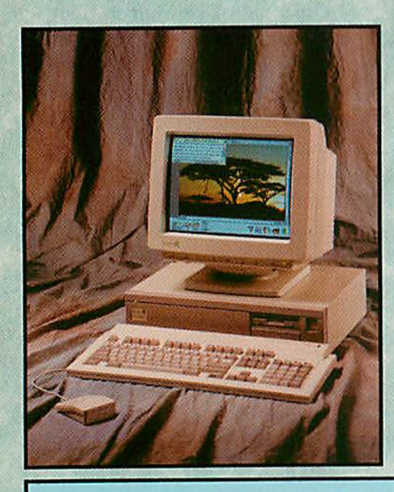
Special Offer £999 + VAT

(£1173.83 INC VAT)

The A3000 Learning Curve is also available if required. This includes Pacmania & Lemmings games, Genesis II Database, 1st Word Plus, Acorn PC Emulator and a 120 min audio training tape. Just add £40 + VAT (£47.00 inc VAT).

Courier Delivery Please add £9.00.

The A5000 Learning Curve



The A5000 is now available from BEEBUG, either from our showroom or mail-order.

BEEBUG are one of Acorns largest dealers and have been supporting the Archimedes range since its launch.

You can have total confidence in BEEBUG. Our technical team are always on-hand to provide any assistance and help that you may need with the A5000.

BEEBUG & RISC Developments also produce the magazine RISC User, dedicated to the Archimedes range.

BEEBUG - The Archimedes Specialists

A5000 Features

- RISC OS Version 3
- ARM 3 For Unbelievable Speed
- 1.6 Mb Format Floppy Drive
- 40 Mb IDE Hard Drive
- Acorn Multi-Scan Monitor

The New Learning Curve Pack

- New Multi-tasking PC Emulator
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The A5000 Learning Curve Complete With Acorn Multi-scan Monitor Is Now Available For £1799 Inc.
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VIDEO MAIL BY THE YEAR 2000

SENDING video mail from a desktop computer should be commonplace by the end of the decade. That is the claim of Dr Andy Hopper, managing director of Cambridge-based Olivetti Research Laboratory, who has been using Acorn Unix workstations to make the video mail concept a reality.

A special laboratory at ORL – jointly funded by Olivetti Systems and Networks and Digital – is currently developing powerful multimedia workstation and networking technology which will allow TV-quality images to be created, stored and transmitted.


THE LETTER OF THE FUTURE

Video mail is just one of the applications made possible by ORL's Pandora project. Based on multiple Inmos Transputers, Pandora's 'box' is a peripheral device for handling networked digital video and sound streams, independent of host hardware and software. Twenty Pandora systems have been built and networked around ORL and Cambridge University to create a true multimedia environment. Each system interfaces to an Acorn Unix workstation, CCD camera, high resolution display, telephone and microphone.

In addition to sending video mail, Pandora can be used for high quality video-telephone or conferencing applications. Dr Hopper, who was Acorn's technical director when the company was founded and was responsible for the introduction of Econet, said: 'Most people find it easier and faster to speak a message rather than write it down, and it will be possible to stop and start again, or edit as you go along. I believe that video mail is one application that will have a major impact on business communications, improving management efficiency and effectiveness and promoting faster decision making'.

Contact Dr Andy Hopper, Olivetti Research Ltd, Old Addenbrooks Site, 24a Trumpington Street, Cambridge CB2 1QA. Tel: (0223) 343000.

WOULD YOU WARRANT IT?

FOLLOWING our recent review of Arm3 upgrades for the A3000, some readers have asked if the fitting of such upgrades is likely to affect the Acorn warranty.

Aleph One, which produces one of the upgrades reviewed, recently sent out the following statement: 'A3000 users can buy the Aleph One Arm3 knowing that it has been tested by Acorn and that fitting it to their computer will not void any remaining warranty.' According to Acorn, although this is true, the technical support department does not offer an official 'seal of approval' to third party products. However, developers are encouraged to consult with Acorn at various stages of development.

● Meanwhile Aleph One has reduced the price of its Arm3 upgrade to £249 plus VAT and a £35 fee for fitting.

FROM RUSSIA WITH LOVE

SOVIET television viewers are enjoying a Russian version of the TV game *Love at First Sight*, featuring graphical on-screen images that were made using an Archimedes 400-series machines.

The show, which is almost a direct translation of the version shown on Sky TV, features contestants who have to decide who to pick for a date. On-screen graphics include a 'love board', contestants' names, a spray of hearts, and so on.

The software was written by Chris Goss of G Graphics, who uses a Prisma 3 graphics engine controlled by an Archimedes. The Prisma unit provides broadcast quality, genlockable video signals to achieve real-time animation and video effects. The computer also generates the sound effects for the show and controls the button interfaces on the contestants' consoles.

Chris Goss has provided computer graphics for many TV shows, including *Jeopardy* and *Busman's Holiday*. He uses Acorn's *PC Emulator* to transfer text files provided by the game show production teams to the Archimedes for manipulation. He writes most of his software in BBC Basic. He explains: 'When TV producers want last minute changes to the computer effects, it would be impractical to have written the programs in C or some other high level language. Basic on the Arc is comprehensive enough to give me all the facilities I need. If I had to rely on an ordinary PC, quite apart from the expense involved, it would be extremely difficult to control everything I wanted from just one machine.'

Contact G Graphics, 37 The Avenue, Twickenham, Middx TW1 1QU. Tel: 081-891 3962.

NEWS IN BRIEF

● **BEEBUG** has come up with a saving of £300 on an A3000 hard drive desktop publishing system. It includes an A3000 computer, Acorn colour monitor, 1Mb Ram upgrade, 20Mb internal IDE hard drive and Ovation DTP software. The system costs £999 plus VAT and is supplied installed and ready to use. You can contact Beebug on (0727) 40303.

● **IN LAST** month's issue we mentioned an advertising insert from ESM about the company's Christmas Theme Pack for Desktop Folio. However, we understand that this may not have appeared in some issues. For information, please write to: ESM, Dept 17, Duke Street, Wisbech PE 13 2AE.

● **PERISCOPE** Software has released Karma - The Flight Trainer to all space cadets (aka high-flying Arc users). The package is the first instalment of the package and provides training which will prove relevant to subsequent releases of Karma. The Flight Trainer for the Archimedes and A3000 costs £24.99 plus £1 p&p and is available from Periscope Software. Tel: (0462) 893107.

● **ALPINE** Software has asked us to point out that the company does not publish Star Trader or Word Up Word Down games, as mentioned in our games supplement. However the company does publish Plague Planet. Contact Alpine Software, PO Box 25, Portadown, Craigavon BT63 5UT.

● **RISC** Developments has introduced two new packages for the Arc. PolyGlot is a foreign language character set package for use with wordprocessors, DTP packages, etc. Characters which are impossible or difficult to obtain from the keyboard – such as letters with characters in French or umlauts in German – are possible with the program. It costs £14.95. Chartwell is a graph and chart package which offers 24 different graph types, including horizontal and vertical bar charts, line graphs, scatter charts, polar plots and pie charts. It costs £24.85. Contact Risc Developments on (0727) 860263.

● **IN OUR** reviews of Elite and Bubble Fair last month we unfortunately did not include the usual product details. Elite costs £39.95 from Hybrid. Tel: (0223) 861522. Bubble Fair costs £19.95 from Eterna. Tel: (0933) 279300.



NEW ACORN PORTABLE FOR BETT 92 SHOW?

AT LAST year's BETT 92 Show, Acorn apparently had a prototype of a portable computer hidden in a plastic bag. It was there in case Research Machines on the stand next door revealed its new Nimbus portable. As it turned out, RM had a prototype in a plastic bag as well – in case Acorn revealed its version first.

Since then, the race to produce a portable for education has been won fairly and squarely by RM, with its Nimbus Notebook range, released earlier this year. The entry level model costs £499.

Of course, this isn't just a two-horse race. There are a host of IBM and compatibles on the market, and Apple has just released its new notebook series. And companies such as The Educational Notebook Company and Tandy are also in the running. So what of Acorn's progress in this area of the market? After all, with machines in 90 percent of schools, they surely cannot afford to wait much longer before releasing a portable range? Well, promises of a release before the end of the year have vanished – and any hope of an appearance at the recent *BBC Acorn User* show were upstaged by the launch of the A5000 machine.

The betting now is on the BETT 92 Show in January. The plastic carrier bags are likely to be discarded and the new model will be on show for all to see – at least, that is the rumour. Whether it will be on general release or just the prototype is even less certain, but a recent letter to software developers from Acorn requested ideas for 'portable applications' – a bit late in the day for a January launch, but at least it indicates some movement. Watch this space!

WATFORD WINNER

VISITORS to the recent *BBC Acorn User* Show were encouraged to enter a special prize draw run by Watford Electronics. The prize on offer was a Panasonic KX-P4420 printer, donated by Watford Electronics and Panasonic, and worth over £700.

The picture below shows (left to right) *BAU* editor Barry Monk, Nazir Jessa, managing director of Watford Electronics and Sam Wauchope, managing director of Acorn Computers, selecting the winning entry, from Mr Hadekel of London SW6.



DISC SURVEY

WANT to win a free subscription to your favourite Acorn magazine? Then give us your opinions of BAU's cover mounted discs by answering the questions below – there are five free subs to be won.

Regular readers may recall the free Archimedes discs which were cover-mounted onto the magazine recently – a demo of ESM's Desktop Folio package in October and demos of Chocks Away and Lemmings in November.

What we would now like to know is your opinions on the possible content of future discs and how much – if anything – you might be prepared to pay for a magazine/disc package.

To help us give you the package you want, please write your answers to the following questions, along with your own name and address, on a postcard and send it to: Disc Survey, BBC Acorn User, Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ. Replies should reach us by no later than January 17 1992. Five free subscription winners will be drawn from the hat when all of the entries are received.

DISC SURVEY QUESTIONS

1. Which disc format would you prefer to receive?
a) 5.25in b) 3.5in

2. How much extra would you be prepared to pay for the magazine with a cover-mounted disc?
a) 50p b) 75p c) £1 d) No more

3. How would you prefer to access the programs featured in the magazine?
a) From the cover-mounted disc
b) Typing in from the current yellow pages listings

4. Would you like to see demos of new programs featured on the discs?
a) Yes b) No

5. What types of program are you most interested in? (You may select more than one category)
a) Games
b) Education packages
c) DTP
d) Databases
e) Spreadsheets
f) Wordprocessing
g) Programming
h) Other (please specify)

NEW TWIST AT QDE

THE QDE Group, which producers of products under The Serial Port label, will launch a new label called Vertical Twist next month.

All products presently marketed under The Serial Port label will be moved across to the new label over the next few months. The only exception is *Arcterm 7*, which will be handled separately by Hugo Fiennes, who will continue trading under the current Serial Port name.

However, QDE will still be selling *Arcterm 7*, including a new range of modem and packs created in association with Pace. QDE Group managing director, Andrew Foyle, said: 'With this new label totally under our control we will give a better level of customer service than was previously possible'.

Contact QDE Group, 30-33 South Street, Chichester, West Sussex PO19 1EL. Tel: (0243) 531194.

SHARE AND SHARE ALIKE

FOR multi-computer organisations who cannot afford to put a printer on every desk, a new device should encourage printer sharing.

Epshare from Micro Control Systems is designed for use with Epson heavy-duty dot matrix and laser printers and allows six users to share the same printer. It has a 1Mb buffer (a 4Mb version is on the way) and allows any Epson printer in the SQ, LQ, TLQ and DFX ranges to be shared. Each device has six input ports – three parallel and three serial. Data can be accepted on all input ports simultaneously and optional automatic form feed is possible. The unit costs £349 plus VAT from Micro Control Systems, Electron House, Bridge Street, Sandiacre, Nottingham NG10 5BA. Tel: (0602) 391201.



SHARE YOUR PRINTING FACILITIES WITH THIS NEW DEVICE



NEW OVERLAY KEYBOARD

THE OLDHAM SEMERC Overlay has been developed by iibit Education Products for Northwest SEMERC. An A3 board with 128 programmable keys on to which software overlays are placed, it is compatible with existing Concept Keyboard software.

Made of sturdy plastic it has a wipe-clean keypad, with rounded edges for safety. A single switch access interface, incorporated into the keyboard, enables it to be used by SN pupils. Using the switch's jack plug disables the keyboard itself.


DESIGNED FOR EASE OF USE AND SAFETY

The education price is £120; this includes support material and discount vouchers redeemable against NW SEMERC software. For more information contact NW SEMERC at Fitton Hill CDC, Rosary Road, Oldham OL8 2QE. Tel: 061-627 4469.

PICK OF THE FLOWER CROP

AS EVERYONE knows, wild flowers are meant to be seen, not picked – a sensible precaution which nonetheless makes identification of the various species one comes across very difficult. One solution is to take a botany encyclopaedia on your trips, but an easier method is to use Mercury's *Wild Flowers* identikit pack.

Children are encouraged to observe the plant in its natural environment. Using a photocopiable activity sheet they record its main characteristics by means of easily recognisable features such as height, colour and the shape of petals or leaves. This data is transferred to the computer for identification by answering questions presented in graphic form on-screen.

The database is in KEY format and contains over 500 flowers, each held as a separate record with 22 fields such as leaf shape and habitat. The Identikit and Key datafile costs £24.43 for the BBC B and Master; the datafile for the Arc is £12. Contact Mercury Educational Products, 8-10 Lower James Street, London W1R 3PL. Tel: 071-287 5060.

Flower shape

Not sure

<SPACE> <↑> <↓> to select <RETURN> to confirm
<ESCAPE> to go back

VISUAL QUESTIONS SHOW EASILY RECOGNISABLE DETAILS

STAR PROJECT

PROJECT GEMINI, funded by British Telecom and managed by NCET, has been set up to examine how electronic communications can help students aged five to 18, and to promote the development of support materials.

It is to consist of a number of individual projects encompassing topics such as fax machines, email and satellite technology. Multimedia has proved effective in supporting the curriculum, and proposals examining the use of a combination of media will be welcomed. Each project will have its own co-ordinator, and is to last at least a term and no more than one year.

Work arising from the projects has to be easily replicable in other schools, and participants are expected to develop materials such as case studies and resources.

There are a number of entry points into the scheme – scheduled to run until August 1993 – each with a closing date for bids; 7 February 1992, 1 May 1992 and 2 October 1992. LEAs and schools wishing to take part should contact the National Co-ordinator, Ian Webster, at 56B Mansfield Road, Brinsley, Nottingham NG16 5AE.

NEWS IN BRIEF

● **4MATION HAS** released a new borders disc to accompany its popular program, Posters. Entitled Ethnic Borders, it contains over 40 designs, the inspiration for many of which came from the author's native homeland, New Zealand. The disc costs £10 from 4Mation, 14 Castle Road, Barnstaple, Devon EX32 8PA. Tel: (0271) 25353.

● **THE NATIONAL** Curriculum Working Party on Modern Languages report, highlighted seven areas to be covered in key stages 3 and 4. These recommendations have been used as the basis for the modules of Bonjour de France: Ma Ville. The first in a series of four Genesis applications, it enables users to work at their own pace and develop awareness of how the language works.

Although based on National Curriculum requirements the pack, which contains nine floppy discs and over 100 worksheets, can be used by anyone starting to learn French. It costs £95 from Oak Solutions, Robin Enterprise Centre, Leeds Road, Idle, West Riding BD10 9TE. Tel: (0274) 620423.

● **ECONOMICS** students will welcome Yes Chancellor as an opportunity to set the economy back on its feet. The simulation includes setting tax and interest rates, and dealing with inflation and strikes.

As you make decisions the computer keeps you up-to-date with the latest economic facts. The new Arc version includes features such as Britain's membership of the ERM. It costs £20 for the BBC and £23 for the Archimedes, from Chalksoft, PO Box 49, Spalding, Lincs PE11 1NZ. Tel: (0775) 769518.

● **GRAPHBOX** Professional has over 40 graph types to cater for all sorts of data, whether you need an accurate representation of this year's examination results or a pictorial display of the area's population density.

It has an in-built editor, and can perform statistical analysis of input data, providing the results in either a CSV file or a text file. As charts and graphs are produced as draw files, they can be exported to other Arc applications.

Graphbox Professional costs £129, or £94 if you trade in the original Graphbox. Contact Minerva Software, Minerva House, Baring Crescent, Exeter EX1 1TL. Tel: (0392) 437756.



VISIT NEW SILICON VILLAGE

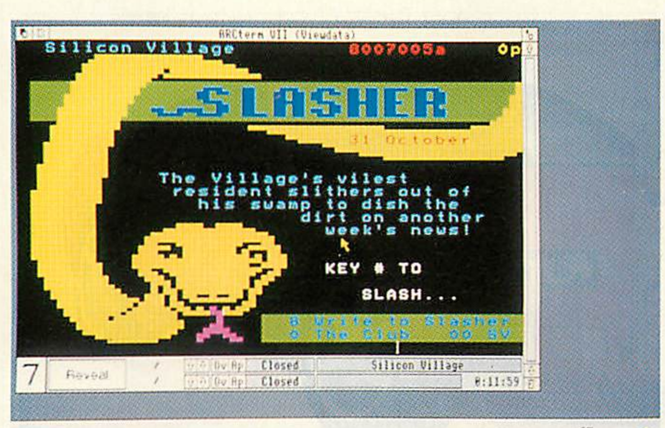
A NEW Micronet-type system has been by created by former Micronet editor, Paul Needs, and the Prestel information providers, New Media Services (NMS).

Called The Silicon Village, it will endeavour to attract many ex-Micronetters after the untimely closure of the system by British Telecom last month. Silicon Village aims to carry on where Micronet left off and, as well as attracting ex-Micronet subscribers, it will be canvassing hard to attract some new members.

Initially the system is operating on two lines, in Reading and London, although local access will be available soon via the Mercury network.

Like Micronet, Silicon Village will be a subscriber-only system, costing £6 per month with additional call charges of 2.5p per minute. However, two free hours are provided with each monthly subscription. In addition, a one-off registration fee of £10 will be charged.

Users of Micronet will be instantly familiar with a number of features offered by the new system. Waveguide provides up-to-date gossip and details on television and radio programs. An active BBC



SLASHER RETURNS NOW THAT SILICON VILLAGE IS OPEN

Micromag is present, edited by long time Micronet member, Geoff Cox. Fans of satirical banter and scandal will be pleased to know that Slasher is back. BT banned the controversial Slasher from Micronet nearly two years ago.

Indeed, being completely separate from BT, Silicon Village is free of many of the restrictions that BT imposed on Micronet. One aspect believed to have caused Micronet's downfall – namely, Chatlines – has been restored on Silicon Village.

Silicon Village is set out very much like a conventional 'village', with 'shops', such as a 'Post Office' for sending electronic mail. You can even go to the 'newsagents' for the latest news from around the world, or pop-in to the 'pub' to catch up on chat and gossip. You can also join one of the numerous clubs or closed user groups to share ideas and views with other people.

Each new subscriber also gets a free 26-frame gallery, where users are encouraged to edit their own frames, or even advertise. Indeed, rumour has it that a certain *BBC Acorn User* columnist may well be setting up an area, very similar to the now defunct BBC Microbase of Micronet.

ARCHIMEDES VIEWDATA SOFTWARE

WAITING FOR the first Archimedes viewdata host software to be released? Then wait no longer – it's here.

Questor Viewdata Host from Mad Rabbit Systems provides sysops (system operators) with a viewdata host system. It runs to Prestel standards under the Archimedes Risc OS environment.

QVH is capable of storing an unlimited number of frames, dependent only on the storage capacity of the hard disc on your machine. Scrolling messages can be displayed anywhere on screen, together with animated (dynamic) frames. Routing can be via numbers, keys or keyword shortcuts and all frames can be password and privilege protectable. One great advantage of the system is that it provides an offline frame editor, that is Wimp-driven.

Of course, full online editing is also provided, enabling you to have remote CUG editors. Full messaging is also catered for, including rotating chatboards. The messaging system also allows output to files to enable offline reading of messages using standard ArcBBs mail readers.

CET downloading, together with X/Ymodem uploading and downloading (under scrolling conditions) is also supported. Files can be tagged by users for easier downloading and the system can be set to download files, only if a previous message has been set by the sysop.

Frame converters for a number of other systems including XFS and CARBBS are planned, as well as Zmodem protocols for scrolling systems. It is also hoped that Questor will be the first viewdata host to support the Fidonet mailing system.

QVH will run on an A3000/Archimedes with 1Mb, although 2Mbyte is recommended, as is a good-sized hard disc. *Questor Viewdata Host* costs £40 from Mad Rabbit Systems (Q), 22 Oakwood Grove, Horbury, Wakefield, WestYorks WF4 5JE.

Paul Vigay

NEWS IN BRIEF

● **FOLLOWING** the closure of Micronet last month, fans of multi-user games, such as Shades and Trash, will be pleased to know that the organisers of Shades have formed their own viewdata network – called Tessier Ashpool Online, or TAO for short. The system is currently based in London on 071-275 9996 (ANSI, 8N1) and you can log on as a guest, for a free demonstration, by using the name 'Guest' and the password 'Public'. If you would like to apply for your own personal account and password, you should write to TAO, Worth Corner, Turners Hill Road, Pound Hill, Crawley, West Sussex RH10 7SL, or fax them on (0293) 885277.

● **THIS MONTH'S** freebie plug goes to what is probably the longest running BBC Bulletin Board service – The Gnome at Home. It has now been online almost since the creation of the BBC in the early 1980s, catering for all users of the BBC and, more recently, the Archimedes. Lots of message areas are supported, along with numerous special interest areas, current affairs and news topics. Some nicely drawn viewdata frames accompany most of the sections too, along with many humorous quotes and comments. Give Gnome a ring on 081-888 8894 (viewdata 7E1).

● **THE ARCHETYPE** BBs has recently moved to a new location in Jersey, so please amend your telephone directories to (0534) 54864. It now also supports 14400 baud for users of HST modems.

● **ALSO ON** the move is the Atlantis BBs. It is now based in Brighton and the new number is (0273) 696060. The system runs on a Courier HST, and supports all speeds from 300 baud up to 9600 baud. There are also some imminent plans to support both FidoNet and Netmail.

● **A PLEA** for help. Do you know what has happened to the London City Magazine BB? It used to be on 081-468 7648, but I believe it has now moved. If you log on to this board, or know its new home, please contact me.

● **IF YOU** have any news, or hints and tips, why not share them with your fellow comms buffs? Send your letters to: Paul Vigay, BBC Acorn User, 20-26 Brunswick Place, London N1 6DJ.



STATE OF THE ARC GRAPHICS

DESIGNED as a professional graphic design package, *ArtWorks* from Computer Concepts looks set to do for graphics what the company's *Impression* package did for text processing.

ArtWorks is an object-based design program, similar to *Draw*. Pictures can be built-up from objects, such as lines and polygons, which when placed can be edited independently.

Being object-based, *ArtWorks* can produce high-quality output, limited only by the type of printer being used.

The package is compatible with illustration packages such as *Corel Draw* on the PC and *Adobe Illustrator* on the Apple Macintosh. This means that you can transfer files created with PC and Mac programs to *ArtWorks*, thus creating an instant picture library.

Written in Arm code, *Artworks* can run very fast. On the new A5000, speeds of up to four to five times faster than similar programs running on 486-powered PCs have been recorded. Even on a standard Arm2-based Archimedes or A3000, *ArtWorks* achieves a commendable speed. *ArtWorks* also contains a versatile collection of tools. Computer Concepts has drawn on all of the best features from the leading PC and Mac drawing packages, and then added a lot more. Although the Archimedes is currently unable to display full 24-bit graphics – 16,777,216 colours on screen – *Artworks* supports 24-bit colour, which can be reproduced through printing. Three types of colour control are supported: HSV (Hue, Selection, Value); RGB (Red, Green, Blue) and CMYK (Cyan, Magenta, Yellow, Key Black). Extended palettes are simulated on screen by dithering, to display thousands of shades simultaneously.



ARTWORKS CAN GET YOUR DESIGN SKILLS INTO TOP GEAR

Graduated fills can be applied to any object and can be either linear (following a horizontal, vertical or diagonal direction) or radial (originating from a single point and spreading in a circular direction). A comprehensive set of distortion tools is provided that allow any object to be stretched in a number of ways. Full perspective projection is possible from any two-dimensional elevation.

In addition to full implementation of Risc OS outline fonts, *ArtWorks* offers further enhancements with text at any angle, or following any predefined curve, or distorted into any shape. New tool modules can be added as required

ArtWorks should be in production by early 1992. The price is expected to be approximately £150. Contact Computer Concepts on (0442) 63933 for more details.

STILL VIDEO IMAGES ON FLOPPY DISC

A NEW method of capturing images has arrived with the recent introduction of the Canon Ion still video camera.

Electronic still video cameras record images using a similar method to that of a conventional video camcorder, except that these images are stored not on video tape, but on a 2in floppy disc inside the camera. These cameras provide (in conjunction with a suitable video digitser) an extremely convenient way of acquiring images from the 'real world'. One firm currently developing such a digitiser for use with the Canon Ion is DT Software. The digitiser makes use of the fact that the camera produces still pictures, so it can perform all of the hard work of decoding colour video in software, rather than with the hardware. This allows use of more sophisticated and accurate filters, resulting in better colour and sharper pictures than those made with existing digitisers.

A combination of software and hardware linking the Canon Ion camera and the computer allows full control of the camera's functions from the desktop. The interface costs either £820 with the camera, or £350 on its own. Expect both to be available sometime in the new year. Contact DT Software on (0223) 841099.

● Meanwhile, a low-cost colour digitiser has just been launched by Romeo. The Midi digitiser is compatible with the Archimedes/A3000 and can digitise images from any still video source. Software is provided to produce animations or slideshows. It costs £175 from Rombo Ltd. Tel: (0506) 466601.

SCRIBBLES

● **WELCOME** to our first monthly column on computer art and graphics. Each month we hope to bring you the latest news and gossip covering everything graphical, including hardware and software. In addition, we would like to hear from anyone who has anything of special interest to say or ask concerning computer graphics.

In future months, there will be a regular 'gallery' slot for artistic computer buffs. Images are welcome in any format, including the eight-bit Model B and Master 128. We look forward to seeing examples of your artistry – don't forget to include details of the packages you used and a description of how you created your image. Write to: Rob Miller, Graphics Column, BBC Acorn User, 20-26 Brunswick Place, London N1 6DJ.

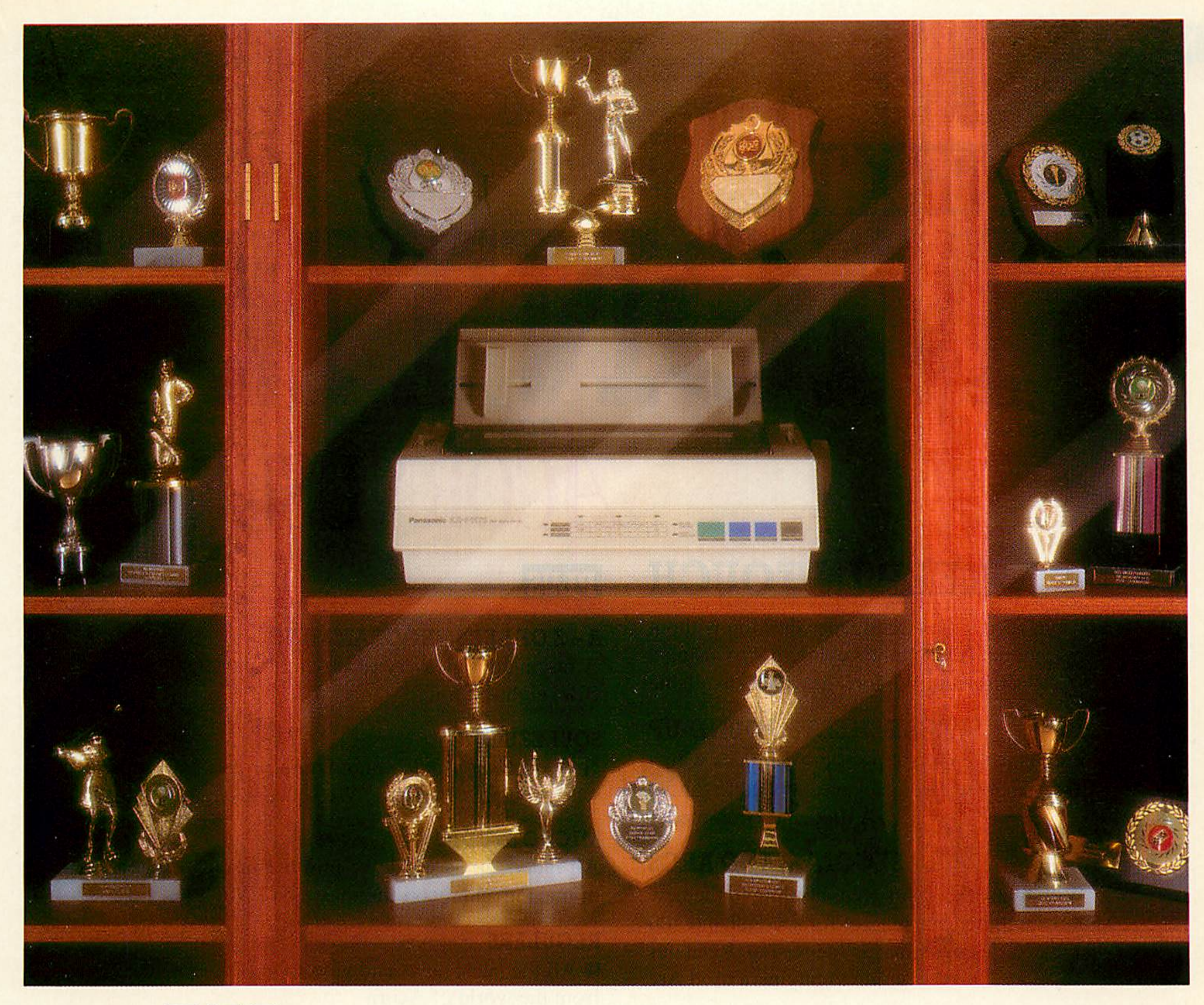
● **AT THE PREVIOUS** Computer Graphics Exhibition there was nothing available for Acorn users. This year, however, saw a new presence appearing among the Iris systems and Silicon workstations.

A handful of Acorn exhibitors were exhilarated by the amount of interest from visitors to the show. Computer Concepts was showing off Artworks, and Wild Vision its new Eagle graphics card, which allows live video to be shown in a window on the desktop.

Our established readers may remember an article about Cadsoft, who use an Archimedes to drive a Millipede Prisma 3 graphics card. The company is still going strong and found the show very promising. Eiedos, another graphics presentation company, also claimed a good response.

UniqueWay, a company new on the Acorn scene, were selling an add-on to the Quantel Paintbox. Via a SCSI link, an A5000 is used to catalogue the images on the Quantel and provide prints of these images for clients: also from UniqueWay was a live linked teletext system running on a 440, which will be of interest to TV companies and trainee film producers. Simis was also showing off its new graphics processor card.

Patrick Neal from Acorn was there, casting a proud eye over the Acorn element, and after the success of the show, we're sure he went back to HQ fired up about Acorns potential within the professional graphics world.



NEXT MONTH

BBC ACORN USER

KEEP IN TOUCH

You can access the Archimedes desktop without pressing the keys on the keyboard – by using a touchscreen. We look at what is available

SPREADSHEETS ROUND-UP

Our popular Stepping Up series continues with a look at spreadsheet packages available for the A3000 and Archimedes

SECONDHAND ARCS

With many Acorn users upgrading to the new A5000 computer, the market for secondhand 300 and 400 series machines is increasing. Read our guide to buying a used Arc

PRIME ART

We look at the latest art and graphics package from Minerva which is aimed at primary school children

PLUS

A – Z OF BEEB PROGRAMMING

A fascinating glossary of programming tips for your BBC eight-bit micro

SQUEEZE IT

How do *Compression* and *ArcFS* programs compare when compressing files? We squeeze out the truth

MICRO STUDIO

All faders up as we delve into the fascinating world of making and recording music on EMR's package

REGULARS

- All the latest news and views from the world of Acorn
- ★INFO – helpful advice and ideas covering the A3000, Archimedes, BBC B and Master
- Your letters and problems
- Programs galore on the yellow pages and much more

Watch out for the February issue of BAU – available January 9 1991

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IDE Hard Disc Upgrades

for the Archimedes & A3000

SPECIAL OFFER
A3000 Internal Drive
Now Only
£195 + Vat

What is IDE?

IDE (Integrated Drive Electronics) is the latest interface standard for connecting hard drives to personal computers and is used in the new Acorn A5000. Our drives all feature a memory cache system, which when coupled with our custom designed 16 bit interface give very fast access times indeed. Typically 50% faster than the Acorn ST506 drives used on the 300 & 400/1 ranges.

What drive options are available?

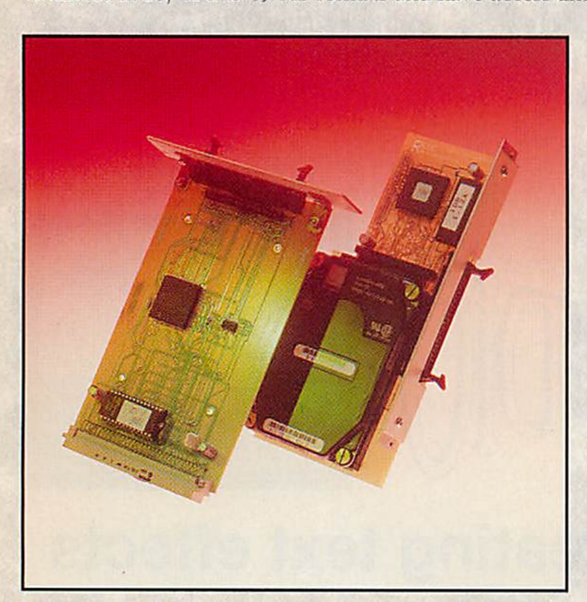
Archimedes 310, 440, 400/1 and 540.

Drive sizes currently available are 42, 89 and 105 Mbyte with a typical access time of 28ms for the 42Mb models and less than 20ms for the others.
These 3.5" drives are available as either internal or external units, and use our high speed 16 bit IDE interface card that fits in your podule backplane. External drives are attractively cased to match the computer and have their own internal power supply and fan. One interface card may be used to control both an internal and an external drive.

A3000

Our A3000 external solutions consist of the 16 bit IDE podule in a special metal podule box which fits to the back of your A3000 (under the monitor stand). Drive sizes are 42 Mb, 89 Mb or 105 Mb. We are also able to offer internal IDE drives for the A3000 that fit into the internal podule slot. These special 2.5" drives are available in 20, 42 and 89 Mb formats and have access times of 23ms.





Hard Cards

These are 2.5 inch hard drives mounted onto our interface card for fitting into a standard podule slot in a 310, 400 or 540 computer. They are particularly useful when you already have one internal hard drive and want another.

What does the future hold?

IDE is a relatively new interface standard, but has already gained massive support. It has been endorsed by Acorn in the A5000 and is clearly the way ahead for users of Acorn systems. The next few months will see drives up to 400Mbyte, with larger capacities, and devices such as tape-streamers following very soon. The future for IDE is very bright indeed.

Quality

You may have total confidence in our products. Only the best drives from recognised manufacturers are used, Conner, Seagate, NEC etc. All drive kits are supplied with full fitting instructions and a user guide to ensure that you will have no problems at all. Our interface conforms fully with Acorn's IDEFS specification.

Money Back Guarantee

If for any reason you are dissatisfied with one of these products we offer a full 14 days money back no quibble guarantee.

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Archimedes 105 Mb	5253	£459.00	5263	£549.00
Hard Card 42 Mb	5291	£495.00		
Hard Card 89 Mb	5292	£695.00		
A3000 20 Mb	5270	£195.00	N/A	------
A3000 42 Mb	5271	£495.00	5281	£359.00
A3000 89 Mb	5272	£695.00	5282	£479.00
A3000 105 Mb	N/A	------	5283	£559.00

All prices include High Speed IDE Drive Interface, Manual & Fitting Instructions.

All prices are Ex VAT

Available from your local dealer, or directly from RISC Developments (please add £9 carriage).



RISC Developments Ltd is an associated company of BEEBUG Ltd.

RISC Developments Ltd, 117 Hatfield Road, St. Albans, Herts AL1 4JS
Tel. (0727) 40303 Fax. (0727) 860263

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£15 STAR LETTER

While using my Archimedes the other day, my mouse threw a complete wobbler and would only allow me to move the pointer left and right, stubbornly refusing to move it up and down.

This has happened before and normally I have cured it by removing the mouse ball and cleaning it. However this didn't work so, reluctantly, I switched off my machine and tried again.

Nothing. Still the same problem. Picking the mouse up I moved the ball with my fingers and everything seemed fine, so why wouldn't it work on the mouse mat?

The answer was simple. The sunlight streaming through the window was falling on the mouse and, because the mouse case is not light tight, it was affecting the left hand photocell: shielding the mouse with my hand proved the point. This was made permanent by sticking some black felt around the outside of the mouse and now everything functions as normal.

I hope this helps any other readers who may be suffering from the same problem, without knowing the cause.

John Scott Paterson
Nyker
Newcastle Upon Tyne

ACROSS THE DIVIDE

I was rather worried when I saw your reply to a query from Wayne Waterson in *BAU* December 91, concerning how to transfer the output from *Draw*, *Paint* and *Edit* to his PC/LaserJet combination at work. Your reply suggested, correctly, that he will need software such as *MultiFS* to get data on to PC/Dos format discs. You went on to suggest the use of *Translator* to convert them to and from Tiff, Giff and other PC formats.

Firstly, I should point out that the Acorn *PrinterLJ* printer driver for the printer in question can produce output directly to a PC disc file. This can simply be copied on to the PC, and sent straight to the printer using the command COPY <filename> PRN. Another Dos command which may help is the PRINT command: PRINT <filename> sends the file to the printer in the background, allowing other Dos programs to run while printing continues.



WOULD YOU PLAY FRAK ON YOUR ARCHIMEDES?

If there is a large amount of print data then this procedure may not work because the amount of data in the file will be more that can fit on to a 640K floppy disc. In this case it can be directed to a large Ram disc, or hard disc on the Arc, and then the resultant file cut up by *Edit* into two smaller files. It could also be compressed by *Spark* into a PC Arc file, and then decompressed on the PC.

The PRINT command on the PC will allow the two files to be printed one after the other. As an example, a standard letter, printed at 150dpi, is around 151k in size and takes 52sec to print out. At 300dpi its size is 592k and it takes around two minutes to print.

Secondly, I should point out that *Translator* is only suitable for bitmap files, and does not support draw files. The PC world has a large number of *Draw* type file formats, and no clear standard. Also, in its more recent public domain versions, *Translator* is a conversion application from Giff, Tiff and so on, to Acorn sprite format, but does not offer conversion the other way. *Creator*, usually supplied with it, will take sprite files and create the specified file format. Finally, can I recommend the use of the Postscript printer driver for DTP and text files. Postscript is far more efficient and a smaller file is created.

Patrick McTiernan
Cricklade
Swindon

The large file problem is something we at *BBC Acorn User* have to cope with regularly. This month's scanners piece (page 151) was printed using four colour separations and the files amounted to around 12Mb per page, the large size being due to the amount of data in the scanned sprites. These files were cut up into smaller 640K chunks and then transferred, via a PC, on to a Macintosh. This was connected to a Linotronic typesetting machine (a Postscript printer which prints at high resolution on to transparent film).

The reconstitution of these files was achieved using the Dos COPY command, in the form of COPY File1+File2+File3 BigFile. This takes each file in turn and adds it to BigFile.

NETTING A BIG ONE

We have ten Archimedes in the college where I teach and I have found them to be an invaluable educational tool.

However, what I would like to do is set up some sort of network, so that we can have shared storage space and work on large projects. As a college I would also welcome the chance to share our beleaguered laser printer.

Fine, you may think. What's the problem? Well, it is this – although I am quite prepared to fiddle around with hardware, I would like some sort of guidance. Have you ever covered the topic in *BAU*?

Katrina Temple
High Barnet
London

***BBC Acorn User* has had network articles before, but we think it is time to start a network series. This should provide all the advice you are looking for.**

TREASURE TROVE

Many people have been complaining about the lack of games conversions from the Amiga, but what about the lack of games ported from the BBC Model B.

Apart from the superb new version of *Elite*, few games have been converted. There are some classics that would bear the crossing well, such as *Exile*, *The Sentinel*, *Revs* and the often forgotten *Cholo* which really deserves to be rendered in colour on the Arc.

Admittedly the Amiga version of *Exile* wasn't that brilliant, but then the Amiga *Elite* isn't as good as Hybrid's version. I'm not saying that we should not transfer games from the Amiga, merely that we should not forget the treasure trove of games that already exist in the Acorn market.

Peter Gouldborn
Putney
London

FINAL POINT?

I read with interest the letter from Sam Wauchope, Director of Acorn Computers Ltd. I especially liked the sentence, '...the A5000 is testament to the fact that we have an excellent product to offer you, which admirably complements the entire range of Acorn Computers'.

I have no doubt he knows what he is talking about and so I would be most grateful to know in what way the A5000 compliments my recently purchased Archimedes A440?

David Williamson
Bognor Regis



QUESTIONS AND ANSWERS

Q I have recently purchased *Elite* for my Archimedes. It seems to run okay, but when I return to the desktop the mouse pointer has frozen and I have to press CTRL-BREAK before I can use my computer again. Is this a problem with *Elite*, or my computer?

James Lee
Norwich

A This is actually due to a minor bug in Risc OS itself and depends on how the setting of MOUSESTEP is configured inside your Archimedes. To cure this, reset the computer and press F12. At the * prompt enter CONFIGURE MOUSESTEP 4 and press RETURN. Then press CTRL-BREAK – this sets the value inside your computer's Cmos Ram, so that you won't need to repeat it each time you load the game.

Q When using *Draw*, I find it difficult to accurately position objects within a larger diagram. Can you advise?

P. Lorimer
Hackney, London

A Although using the Grid option can help you to position objects more accurately, it doesn't always provide you with the fine movement required to 'adjust' positions over small distances – for example, to move shapes up and down by single pixels. To overcome this, a feature that is often overlooked can be used.

When you are dragging an object around the screen, the cursor keys can be used to move it by single pixels in each direction.

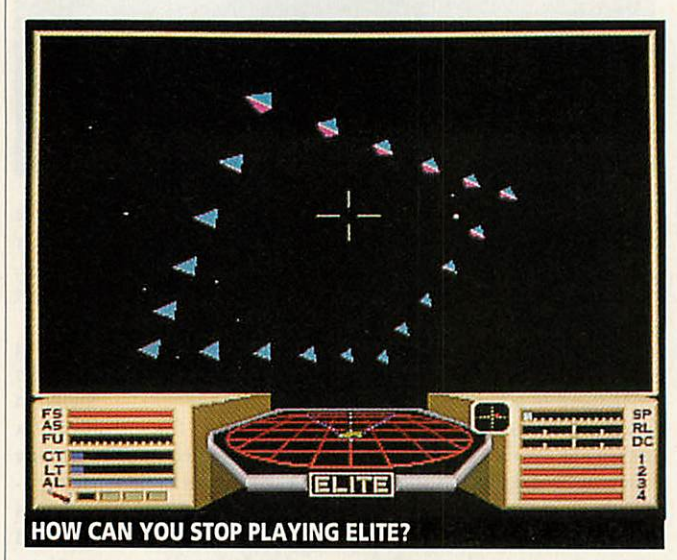
Q What is the easiest method of resetting the internal clock on the Archimedes?

John Freeman
Salisbury

A There are two simple methods for doing this. The first is to load the *Alarm* application from Application disc 2, clicking the middle button over its icon and selecting Set clock. You can then amend the time by clicking on the relevant up and down arrow icons. When you are satisfied with the settings, click on OK.

A second method of setting the clock is to go into Basic by pressing F12 and typing *BASIC. Then type PRINT TIME$ which will show you the current time.

You can then change this by typing TIME$="<the new time>" where <the new time> is in the same format as that shown by the PRINT statement. Type QUIT followed by RETURN twice, to get back to the desktop.



HOW CAN YOU STOP PLAYING ELITE?

Q I have a number of fonts but, to avoid problems when using *Edit*, I have split them into several directories, each containing a small number of fonts. Is there any way I can get one font directory to install those fonts stored in a different directory, so that software like *Impression* can see all of the available fonts?

R. McCann
Birmingham

A One way around this problem is to make each font directory daisy-chain another so that if, for example, you have font directories Fonts, Fonts2 and Fonts3, you can tell Fonts2 to also load Fonts1 and get Fonts3 to load Fonts2 (which in turn will load Fonts1). That way you can store less frequently used fonts in their own directories.

To do this, it is simply a case of changing a line in each Font directory's *!Run* file. First, locate and load *Edit*, then open the font directory by double clicking on it while holding the SHIFT key down. Load *!Run* into *Edit* by dragging it on to the *Edit* icon. Next, move the cursor down to the end of the line that reads:

```
SetMacro Font$Path
<Font$Prefix>.
```

You should then add to the end of this line the exact filename of any other font directories, separated by a comma. For example, to modify the above line so that it installs Fonts2 (which is stored in the root directory of your hard disc) change it to the following:

```
SetMacro Font$Path
<Font$Prefix>. , :4.!Fonts2
```

Make sure you remember to insert the space either side of the comma. You can then amend other *!Run* files in a similar fashion.

Q I have bought an Amstrad SM2400 modem which I would like to use with my BBC B computer, but I do not have the correct lead. Can you help?

Ron Greenaway
Cheltenham

A The Amstrad requires a 5V line on the serial port, which you can obtain from the analogue port on the BBC. Firstly, wire up a lead as follows:

Beeb	S2400
Tx	Pin 2
Rx	Pin 3
RTS	Pin 4
CTS	Pin 5
0v	Pin 7

Then take a piece of wire from pin 1 of the analogue port (5V) and connect it to pin 20 of the modem.

Q I have recently transferred some of my tape based programs on to disc, but when I try to run them I get the 'No Room' error. What is going wrong?

A. Walters
Clapham, London

A When you have a disc interface installed, it claims a bit of your memory for its workspace. However, this is only needed when you are actually loading the program. Once loaded, your program can reclaim any 'lost' memory.

To do this you need to move your program to the position where it would normally reside on a tape-based machine. This is normally at PAGE=&E00. You can add a few lines to the end of your Basic programs to automatically do this for you, so that in future your program will run as normal. The lines you

need to add are;

```
1 IF PAGE<>&E00 THEN GOTO 10000
10000 *KEY 0*TAPE|MFORA%=0TO(TOP-PAGE)STEP4:A%!&E00=A%!PAGE:NEXT|MPAGE=&E00|MOLD|MRUN|M
10010 *FX138,0,128
10020 END
```

Line 1 will check to see if the program is located at &E00. If it is not, the short routine at line 10000 will be executed, which will move the program to &E00 and then run it. If your program has more than 10000 lines you can change the lines above, but remember to change the GOTO as well.

Q There are numerous desktop publishing-type packages around for the Archimedes, but I still have my trusty Model B. Could you tell me if there are any DTP packages available for my Beeb?

Robert Higgs
Chelmsford

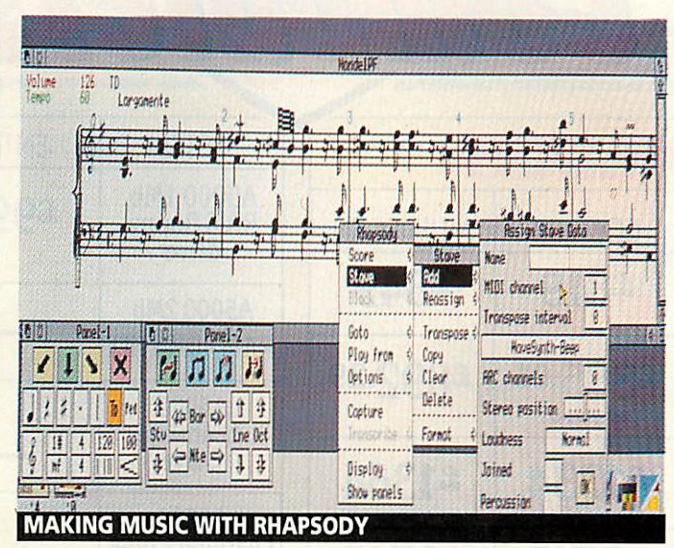
A Yes – in fact, there are quite a few to choose from. Probably the most comprehensive is *Wapping Editor* from Watford Electronics, which has a host of features including working on virtual documents from disc and different scalable fonts. *Pixel Perfect* from AVP Computing is another DTP-type package which is easy to use and has a range of useful features.

Q I am writing a short program on the Archimedes which I would like to use to reset my machine, as if CTRL-BREAK had been pressed. Is it possible to perform this task via software? And if so, how?

N. Willison
Cardiff

A You should be careful about resetting the machine using software, as other tasks will be killed, with possible loss of data. But the following snippet of code can be added to your program. To reset the machine, simply CALL code%

```
DIM code% 100
FOR pass%=0 TO 2
STEP 2
P%=code%
[ OPT N%
MOV 0,#200
MOV 1,#3
MOV 2,#0
SWI "XOS_Byte"
MOV 0,#58720256
LDR 1,[0]
STR 1,[1,-1]
SWI "XOS_EnterOS"
TEQP PC,#-6710886
MOV PC,#0
]
```



MAKING MUSIC WITH RHAPSODY

Q At school we would like to transfer some BBC software to the BBC A3000 and we have been told that using the serial port is the simplest method. Is there any easy-to-use, multi-tasking software to enable us to do this?

L. Gooch
Preston

A Firstly, you will need to fit the optional serial link chips, which your dealer can fit. A company called Ivoryash Ltd produces a multi-tasking wimp serial link between the A3000 and BBC eight-bit computers. This way you can drag the files you require from one directory viewer to another, in a similar fashion to copying files on the Archimedes. Ivoryash can be contacted at 14 Perwell Close, Bredon, Tewkesbury, Glos. GL20 7LJ. Tel: (0684) 73173.

Q I have just bought a BBC A3000 computer and would like to know what packages exist for helping me to learn and compose music? I don't have a Midi interface yet, but I intend to add one.

S. Scott
Bournemouth

A *Maestro*, a fairly comprehensive music program is supplied free with the A3000, and allows you to create quite complex compositions using standard musical notation, with the notes laid out graphically on a five-note stave. You can also add a Midi interface and send the notes to an external musical instrument if you wish. However, *Maestro* can be limiting if you want to create complex harmonies and change your instruments in mid-tune.

***Rhapsody* from Clares is similar to *Maestro* – it can read existing data files and offers other features, such as the ability to print out complete scores and control multiple instruments.**

Q I have a 1982 BBC Model B and have recently purchased a Universal type teletext adaptor manufactured by Ground Control.

The adaptor was purchased secondhand – so I cannot expect too much, but basically I cannot get it to work at all. I have connected it up to my computer and connected it to the TV aerial, all to no avail. I have a feeling that I need some software to drive everything. Maybe you can suggest a suitable remedy.

N Levens
Oxford

A It could be that your teletext adaptor can be controlled by the Advanced Teletext Rom. If this is the case, then you are in luck.

The Advanced Teletext Rom was developed by BBC Soft, to replace the Acorn Teletext Filing System Rom that the Acorn Teletext adaptor was originally supplied with. Versions of the Advanced Teletext Rom are available as a plug-in Rom that goes into one of the BBC's sideways Rom sockets. You should be able to purchase this type of Rom from a dealer such as Watford Electronics. However if you have difficulty, you could try contacting the BBC Teletext Service at the BBC TV Centre in Shepherds Bush London W12.

The ATS Rom package comes with extensive documentation so you should be able to set it up without too great a problem.

HELP US TO HELP YOU

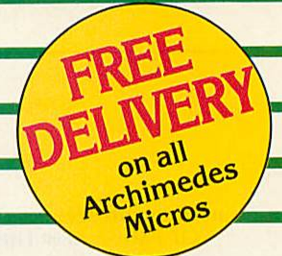
The Questions and Answers page is your chance to have your problems solved. It can be on any topic – you name it and we'll try to solve it. Please send your questions, whether technical or otherwise, to:

Questions and Answers
BBC Acorn User
20-26 Brunswick Place
London, N1 6DJ.

We are happy to answer your queries on these pages, but regret that we are unable to send personal replies to questions sent in. If you send a disc, please put your name and address on the disc itself. It is also useful if you could include full details of your machine. Please enclose an SAE where necessary and mark on your envelope whether you use a BBC eight-bit micro or 32-bit Acorn A3000/Archimedes



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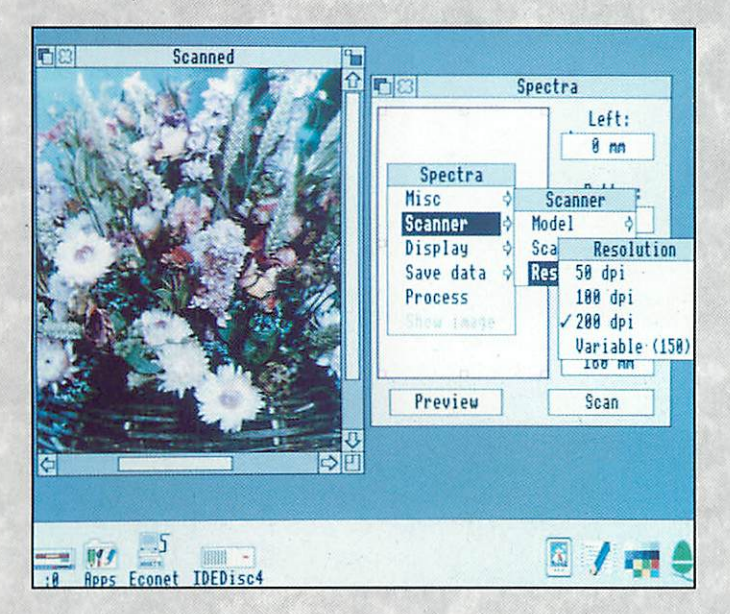
Before buying a mono scanner consider that with *Spectra* you can scan 256 grey scale mono, as well as full colour. When making comparisons, bear in mind that *Spectra* scans automatically, and therefore should be compared with mono scanners with sheet feeder if available. Equivalent 256 grey scale mono scanners with sheet feeder would cost £350 (A6), and £1000 (A4) making *Spectra* extremely competitive.

Possible Applications

School/college magazines, brochures, letterheads, title screens, house details for estate agents, maps, logos, colour tone (e.g. temperature) analysis, 24-bit image processing (processing/analysis software not supplied), photo databases e.g. family albums.

Ease of Use

Spectra is a revolution in colour scanning systems for the Archimedes, A3000 and A5000. Its clever design means that *Spectra* is as simple to use as you could possibly want, but as powerful as you will ever need, producing professional results first time, every time.



In its simplest mode, all you need to do to grab a full colour image is place the original under the scanner, load the supplied software and click on 'Scan'. This will scan the original in an amazing 16 million colours and then automatically convert the data using Acorn's powerful ChangeFSI system into a 256-colour RISC OS sprite that will be displayed on screen. The sprite can be saved, printed or dragged to any package supporting the import of sprite files, including all popular DTP packages.

Price Information

Order code	Model	Price
0118	Spectra - Archimedes/A5000	£549.00
0119	Spectra - A3000 Internal	£549.00
0117	Spectra - A3000 External	£569.00

All prices exclude VAT. If ordering direct from RISC Developments, please add VAT & £9 for insured carrier delivery. The A3000 internal model (code 0119) will be available early 1992, the other models are available now.

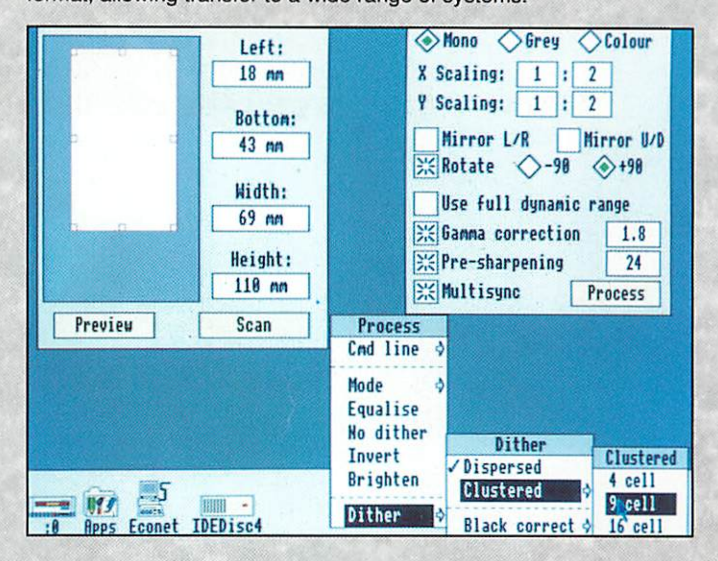


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*This advert was produced using **Ovation** - the professional DTP system from RISC Developments.*

Choice of Sixteen Million Colours, 256 Greyscale or Black & White Scanning

For more advanced use you can specify the resolution and choose between monochrome, grey and full colour images before scanning. After the scan is completed, a wide range of image processing parameters can be altered to provide full control over features such as gamma correction, pre-sharpening, output mode, scaling and dithering. The image can then be stored as a 256-colour RISC OS sprite, or as 24 bits per pixel file using the industry standard TIFF format, allowing transfer to a wide range of systems.



Scanning images smaller than the maximum area couldn't be simpler. A quick preview scan will show a rough of the image in the main scanning window. You can then select the area to be scanned by dragging the margins on screen, or for absolute control you can enter the measurements directly. To make life even easier, you can choose one of three methods for displaying the scanning dimensions and choose between millimetres and inches.

Completely Multi-Tasking

To avoid the annoying wait associated with some colour scanners, *Spectra* is fully multi-tasking throughout the scanning process. As data is read, it is stored directly to disc, or buffered through memory, the buffer size being fully configurable. In either case, the effect on other applications' performance is hardly noticeable.

Whilst the Spectra range can be used with any RISC OS system, a minimum of 2Mbytes of RAM and a hard disc drive is recommended to make full use of the features.

Technical Specification

Scanner:	*Sharp JX100*
Interface:	*RS232 Serial, 115200 baud*
Interface card:	*Half-width, high speed serial card*
Scanning system:	*Motorised scanning head*
Scanning method:	*Reflective CCD sensor*
Illumination:	*Calibrated white-light fluorescent lamps*
Scanning modes:	*Monochrome, 256 grey scales & full colour (16 million levels)*
Scanning area:	*100mm by 160mm (maximum)*
Resolution:	*50-400 dots per inch (201-400 dpi are simulated)*
Software:	*Low-level driver code in EPROM on interface card, RISC OS compliant application, supplied on disc*
Scanning time: (at 18°C)	*40 seconds (Monochrome preview) 6 minutes (Full colour, 3 passes at 100 dpi)*
Documentation:	*48 page A5 user guide - wire bound*
Contents:	*Scanner, interface card, power supply, user guide, application disc, dust cover*

RISC Developments reserves the right to change the specification without prior notice.

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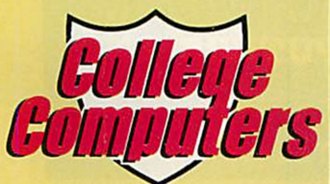


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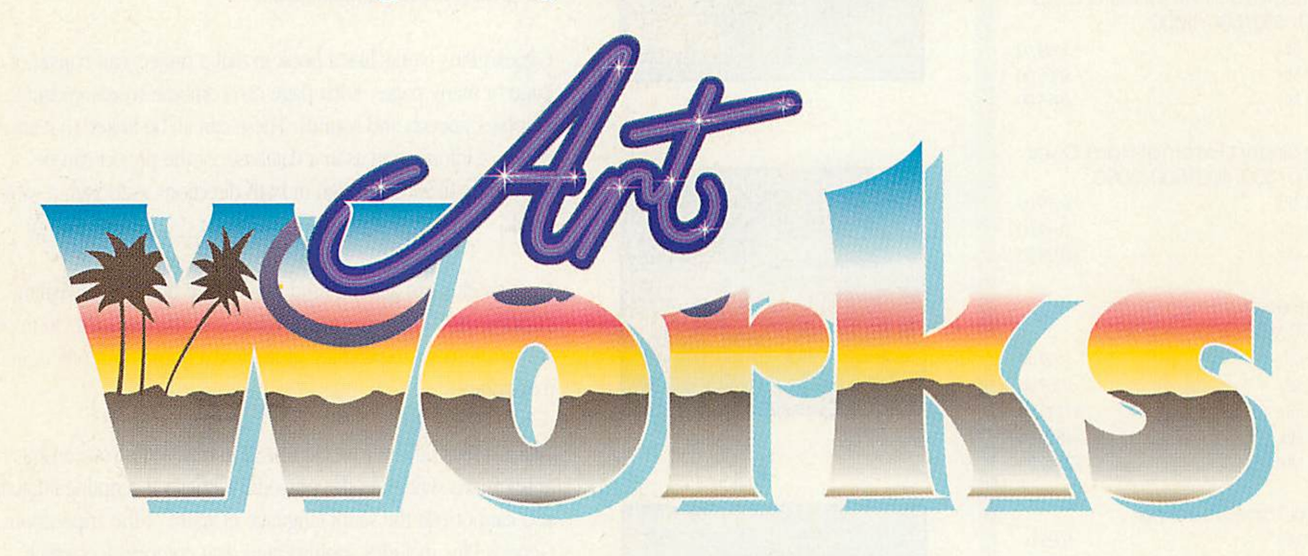
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• MIDI add-on to I/O Podule	£27
• MIDI Expansion Card	£65
• Sound Sampler Mono (Armadillo)	£129
• Sound Sampler Stereo /Midi (Armadillo)	£186
• Chromalock Podule (Wild Vision)	£275
• Econet Network Board	£42
• Archimedes IEEE Interface Adaptor	£269
• Dual RS232 Podule	£195
• 16 bit parallel I/O Card	£195
• Archi replacement mouse – New design	£32
• PC Emulator v1.7	£85
• Software Developers Toolbox	£149
• Floating Point Unit	£455
• SCSI Adaptor Expansion Card	£156
• Keyboard Extension Lead	£6
• 2 Podule Backplane	£25
• 4 Podule Backplane	£38
• Fan for above backplanes	£8
• Risc Os Extras Software Disc	£5
• Ethernet Card	£220
• SCSI Card 8 bit	£129

A3000 Accessories

• 3.5" External Drive	£95
• Monitor Stand	£15
• Technical Manual	£39
• Serial Upgrade	£17
• A3000 Dust Cover	£5
• A3000 plus Monitor Dust Cover	£9
• A3000 User Port/Midi Upgrade Card	£44
• A3000 User/Analogue/IIC I/O Card	£42
• A3000 External Podule Case	£13



Christmas Bonanza Archimedes A3000 Desk Top Publishing (DTP) Offer

A3000 BBC Archimedes Micro with 3.5" Floppy Disc Drive and a mouse, upgraded to 2Mb RAM, COLOUR Monitor + Lead, 20Mb fast IDE Hard Disc Drive, 'Compression' Utility to increase the Hard Drive capacity to Typically 40Mb, The highly acclaimed Computer Concept's Impression Junior DTP software package.

RRP: £1299

Xmas Offer Price: £849

Special Education Discount available. Please telephone



0923 250235



Archimedes RAM Upgrade

All our memory upgrades are simple to fit. No soldering required. Fitting instructions supplied.

• **R302**-A3000 – to 2MB RAM Upgrade	£39
• **R303**-A3000 – to 2MB RAM Upgrade (expandable to 4MB)	£65
• **R304**-A3000 – to 4MB RAM Upgrade	£139
• **R311**-A305 – to 1MB RAM Upgrade	£30
• **R312**-A305/310 – to 2MB RAM Upgrade	£149
• **R314**-A305/310 – to 4MB RAM Upgrade	£265
• **R412**-A410/1 – to 2MB RAM Upgrade	£35
• **R413**-A420/1 – to 4MB RAM Upgrade	£64
• **R414**-A410/1 – to 4MB RAM Upgrade	£98
• **R810**-A410/1 – to 8MB RAM Upgrade	£599
• **R820**-A420/1 – to 8MB RAM Upgrade	£569
• **R840**-A440/1 – to 8MB RAM Upgrade	£499
• **R814**-R140 – to 8MB RAM Upgrade	£499

0% Finance & Special Teachers/Academics' prices Now available on A3000L/C and A5000 L/C Micro Systems

Convert your Archi 410 to a 420 or 440 with Watford's unique Upgrade Kits

UP10 – to 2MB RAM + 20MB Hard Disc	£165
UP15 – to 2MB RAM + 40MB Hard Disc	£252
UP20 – to 4MB RAM + 20MB Hard Disc	£232
UP30 – to 4MB RAM + 40MB Hard Disc	£318
UP40 – to 4MB RAM + 53MB Hard Disc	£438

Graphics, Art, Design & Games

GRAPHICS

ARCtist	£19
ARCticulate	£19
Atelier	£65
Artisan II	£45
Artisan Gallery	£16
Autosketch II	£65
Craftshop 1 & 2	£28
Euclid 2	£50
Graph Box	£59
Graphbox Professional	£118
HotLink Presenter	£40
Kermit	£46
Mogul	£17
Poster	£79
Pro Artisan	£70
Prime Art	£69
Render Bender	£58
Snippet	£21
Tween	£21

GAMES

Air Supremacy	£20
ARCticulate	£19
Apocalypse	£15
Arcade 3 Compil.	£12
Arcade Soccer	£15
Arc Trivia	£18
Avon	£16
Blowpipe	£16
Boogie Buggy	£19
Break 147	£19
Bug Hunter	£14
Caverns	£14
Chess 3D	£14
Chocks Away	£14
Chocks Away Extra	£14
Conqueror	£18
Cops	£14
Corruption	£18
Crisis	£21
Elite	£33
Enter the Realms	£19
Enthar Seven	£21
E-Type	£14
E-Type Designer	£13
E-Type Extra 100 miles	£13
Family Favourites	£15
Fireball 2	£19
Gumshoes	£19
Holed Out Designer	£13
Holed Out Golf	£13
Hostages	£15
Ibix the Viking	£14
Inter Dictor 2	£26
Iron Lord	£15
Jiglet	£25
Jigsaw	£27
Lemmings	£22
Masterbreak	£16
Magpie	£39
Man at Arms	£16
MahJong Patience	£15
Manchester United Europe	£19
Nevryon	£14
Olympics	£15
Pipe Mania	£17
Pirate	£16
Power Band	£18
Puncman 1 & 2	£16
Puncman 3 & 4	£16
Pysanki	£15
Quazer	£10
Real McCoy	£22
Real McCoy 2	£23
Redshift	£14
Return to Doom	£16
Revelation	£54
Repton 3	£15
Rotor	£19
Saloon Cars	£19
Splice	£25
Sporting Triangles	£24
Star Trader	£14
Superior Golf	£15
Super Pool	£19
Talisman	£12
The Pawn	£19
Thundermonk	£11
Timewatch	£24
Trivial Pursuit	£22
Twin World	£15
U.I.M.	£23
White Magic	£15
White Magic 2	£15
Wimp Game	£13
Worldscape	£16

Miscellaneous

Ancestry	£59
Arccomm 2	£38
Arcterm 7	£64
Armadeus Sound	£60
BBC DFS Reader	£6
Blowpipe	£17
Broadcaster Loader	£65
Compression (CC)	£44
Equasor	£47
FlexiFile	£98
Genesis	£65
Genesis 2	£113
Hearsay Comms Pack	£50
Investigator 2	£22
JX Archi Colour Printer Driver for Citizen & Star	£15
Numerator	£66
Presenter 2	£35
Presenter Story	£145
Rainforest	£17
Revelation	£58
Rhapsody in Blue 2	£45
Speech!	£15
The Victorian	£17
Time Tabler	£549
Toolkit (Clares)	£35
Touchtype	£40
Tracer	£46
Tracker	£39
Vox Box	£47
WorldScape	£17

Archimedes Hard Disc

Watford's ST506 Hard disc drives for A310 & A410 series fit internally into the space provided.
P.S. A310 upgrades require a backplane and a fan.

- **3HDP** – Hard Disc Podule only £135
- **3HD20** – 20Meg H' Disc + Podule for 310 £235
- **3HD40** – 40Meg H' Disc + Podule for 310 £345
- **3HD50** – 53Meg H' Disc + Podule for 310 £474
- **4HD20** – 20Meg Hard Disc for 410 £129
- **4HD40** – 40Meg Hard Disc for 410 £215
- **4HD50** – 53Meg Hard Disc for 410 £335
- A3000 20Meg Hard Disc + Podule £299
- A3000 40Meg Hard Disc + Podule £429

For Archimedes IDE Hard Disc turn to page 14

Desk Top Publisher

Acorn's Archi DTP Package	**£108**
Equasor	**£39**
Impression 2 DTP Pack	**£130**
Impression Junior	**£72**
Expression-PS	**£19**
Tempest DTP Package	**£90**

More Archimedes Products See Pages 3, 5, 6, 8, 10, 14

Archi Wordprocessors

Pendown Archi	£48	Archie Spell Master	£25
Wordwise + Disc	£24	PD Spellchecker	£40
Image Writer	£25	View	£45
Interword Disc	£24	Graphic Writer	£19
1st Word Plus – 2	£63	EasiWord	£18

Databases

AlphaBase	£36	Magpie	£40
Knowledge Organiser	£42	Multistore v2.01	£185

Spreadsheets

Intersheet Disc	£24	Schema	£89
Viewsheet	£45		

Business Graphics

GammaPlot	£39	Sigmaplot	£39
Interchart Disc	£17		

Integrated Packages

- Logistix £79 • Pipedream 4 £149
- Desktop Office – Database, Graphs & Charts, Wordprocessor Spreadsheet, Communications £98
- Desktop Folio – Wordprocessor, Desktop & Interactive Publishing. Ideal for school environment. £75

A3000 I/O Card (User, Analogue & IIC)

This NEW versatile I/O Card from Watford, fits inside the A3000 and includes an Analog to Digital Converter, a User Port, and an InterIC (IIC) connector.

The card allows many of the peripherals developed for the BBC to be used with the Archimedes A3000. The ADC and User Port have the same pin out and connectors as the BBC computers.

Extensive RISC OS software is supplied to provide BBC OSBYTE calls for support of the ADC and User Ports, including the BASIC keyword ADVAL. The software provides extended RISC OS support for separate interrupts from both the ADC and User Ports, permitting easy interrupt driven operation.

The card is provided with all the software in ROM and is automatically loaded when the machine is turned on.

Peripherals connected to the ports can obtain up to 500mA of power at +5V. A fuse is fitted to the card to protect the A3000 from damage arising from accidental short circuit of the power output.

The card is provided with an extensive manual explaining installation, all software commands, connector pin outs, hardware addresses and example programs.

Features
- An 8 bit User Port with a standard 20 way IDC connector, compatible with the User Port on the BBC computers and the Archimedes I/O Podule.
- A 10 bit Analog to Digital Converter with a standard 15 way D type connector, compatible with the ADC on the BBC range of computers and the Archimedes I/O podule.
- An InterIC (IIC) Port with a 5 pin DIN socket to connect the A3000 to external IIC devices.

£42

Archi Mouse Port Splitter

Our handy little splitter unit eliminates the risk of damaging your micro due to constant plugging and unplugging of the mouse by allowing you to connect both, a joystick and a mouse simultaneously to your Archimedes. £15

Silicon Vision

Gerber Plot	£95	Solids Render	£120
Solid CAD	£120	Solid Tools	£279
Super Plot	£28	Data Vision	£110
Super Dump	£22	Share Holder	£135
Arc PCB Professional			£275
Realtime Solids Modeller			£136

Archimedes to BBC Serial Link Mk 2

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with a disk, and the necessary cable to connect the two computers.
New RISC OS Version **Only £15**

Archimedes External Disc Drive Interface

With this interface it is possible to connect almost any 5.25"/3.5" disc drive with its own power supply to the Archimedes. Upto 4 disc drives can be connected. Fully Buffered Board. NO SOLDERING is involved. Supplied complete with necessary lead.
- A300/A3000 £21 • A400 £25

Special Education Prices

All education establishments qualify for special education prices on micros, etc. Please write in or telephone (0923) 37774 or 50335 for written quotation.

LANGUAGES (Archimedes)

ISO-PASCAL; FORTRAN 77			£77 each
Assembler; LISP; Prolog X			£149 each
ANSI C Rel. 3	£125	BASIC Compiler	£77
Cambridge Pascal	£60	Logotron Logo	£45
Macro Assembler	£40	Risc Basic	£120
Robo Logo	£69	Risc FORTH	£110

NEW 256 Grey-Scale Scanner

Watford proudly introduces its new innovative 256 grey-level hand scanner for the Archimedes range of micros. It offers up to 400 dpi scanning resolution, complete with software.
256 Grey-Scale Scanner is ideal for incorporating pre-drawn logos, artwork, photographs and sketches into desktop publishing documents and other graphics programs. Designed by our own R & D team, it offers the best overall scanning solution for Archimedes micro. Just compare the competition on our price and these outstanding features:

- Full 105mm 400dpi scanning operation in just 3mS per line! (Twice as fast as most scanners.)
- Selectable 256/16/4 grey levels
- Full scan preview, scale to fit windows
- Complete set of image enhancement tools
- Single width podule
- True brightness and contrast control
- Fast RISC OS printing
- Five-function edge detection software, Laplace convolution matrix image enhancement, image smoothing, etc.

Special Launch Price £185

Minerva's Archimedes Software

EasyWord	£18	Mailshot*	£27
Home Accounts	£35	Reporter*	£27
Time Tabler	£549	School Admin*	£65
System Delta	£59		

System Delta Program Reference Manual £29
** Requires System Delta to operate*

Stand alone Business Accounts Packages
Sales; Purchase; Order Processing and Invoicing; Nominal; Stock management
£79 per module
or Complete Business Package **£325**

ULTIMUM – Archimedes A3000 Podule Racking System

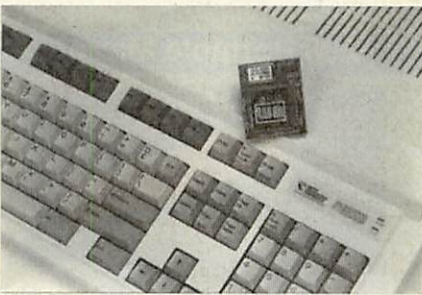


THE ONLY LOGICAL WAY TO EXPAND YOUR A3000 COMPUTER

Price: £125

ARM 3 Turbo Card

Simply The Best



Here it is at last – the all new Mark 2 version of Watford's highly acclaimed ARM 3 processor board for the Archimedes and now also the A3000 series computers. Using the latest surface mount technology on a high quality four layer circuit board we have reduced the overall size to a mere 53mm x 45mm, and the cost to only £199. Mk II upgrade will increase the speed of your micro by a factor of 3 to 6.
Any competent A300 or A400/1 series micro owner can fit the upgrade himself, as we provide full fitting instructions and a special ARM chip extraction tool. However for A3000 micros and those not wishing to perform the upgrade themselves, we will collect, upgrade and return your micro by courier service, at an additional cost of £35.
(A300 and old A440 series owners please note – you will need to upgrade to MEMC1A for ARM3 to work.)
In response to our customers planning their seasonal budget, we have agreed to extend the ARM 3 £199 launch price over the holiday period until the middle of January 1992.

RRP £249

Offer Price £199

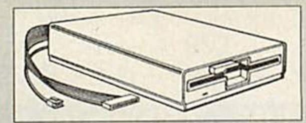
All our A3000 ARM 3 upgrades are fitted by Acorn approved Board level & surface mount technology Service Centre without invalidating the warranty.

Continued→ → → → → → → → → →

BBC MASTER

MASTER 128K Micro incl. Acorn's View, Viewsheet, ADFS, BASIC Editor & TERMINAL plus FREE OFFER (see below) **£399**

FREE OFFER



A 5.25" Double Sided, 40/80 track switchable 400K Disc Drive complete with cables and a Utilities disc incl. 2 games, plus

Gemini's OFFICE MATE & OFFICE MASTER packages on Disc consisting of: Database, Spreadsheet, Beebplot graphics. Accounts packs: Cashbook, Final Accounts, Mailist, Easyledger, Invoice & Statements, Stock Control.

FREE with every BBC Master purchased from us during December

Add-Ons & Accessories

Econet Module for the Master		£45
Twin ROM Cartridge for Master		£9
Quad ROM Cartridge for Master		£14
Master Reference Manual I	(No VAT)	£14
Master Reference Manual II	(No VAT)	£14
Master Advance Ref Manual	(No VAT)	£17
64K Upgrade Kit for B+		£32
Acorn 1772 DFS Kit complete		£49
ECONET Upgrade Kit for BBC B		£42
ALL ECONET UPGRADES Available		
ARIES' IEEE Interface for BBC B & Master		£238
Morley Teletext Adaptor with ATS Rom		£99
Ecolink		£270

Z88 Portable Micro



£179

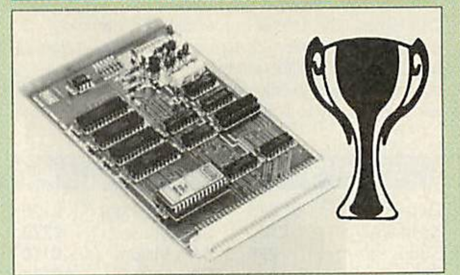
FREE

With every Z88 purchased from us, we are giving away absolutely FREE, a Z88 to BBC Interface Link, 4 rechargeable batteries and a compact Mains Battery Charger worth £38.

Z88 ACCESSORIES

- 32K RAM Pack or 32K EPROM Pack £16
- 128K RAM Pack or 128K EPROM Pack £32
- 512K RAM Pack £86
- Z88 Eprom Eraser Unit £38
- Z88 Spellmaster for Pipedream £40
- Z88 Carrying Case £8
- Z88 Computing Book £9.95
- AA Nicad Rechargeable Battery £1.50
- Battery Charger Compact & Fast £6
- Z88 Serial Printer Cable £8
- Z88 Parallel Printer Cable £18
- Z88 to Archi Link £15
- Z88 to BBC Link £8
- Z88 to PC Link II £27
- Z88 to Macintosh £32
- Z88 Mains Adaptor £9
- Z BASE £56
- Z TAPE £42
- Z TERM £42
- Z88 Modem £114

Archi Real-Time Digitiser



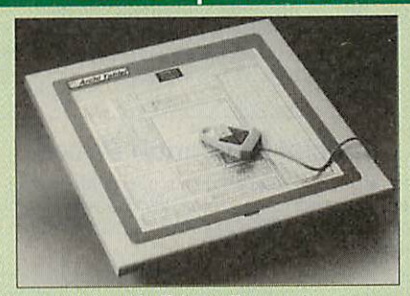
Now supplied with NEW RISC OS Version Software

Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air televison signals may also be digitised via a video recorder or TV tuner. Please write for further details.

Price £155

A Set of Colour Filters for colour image grabbing using a video camera	£16
New Risc-OS Software Upgrade	£39

Archi Graphic Tablet



The Archi Graphic Tablet offers performance and accuracy comparable to other tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely. The package is supplied complete with sophisticated Archi software. (Now, fully LinCAD compatible. Recommended by Linear Graphic for use in Education).
(FREE this month, PC Mouse Drivers & Art package)

Special Price £199
(Price includes Tablet, Leads, Software & Puck)
Stylus Optional Extra **£15**

Archi Graphic Tablet Junior. Working area 9" x 6". Price includes Stylus **£125**

Disc Plonker Rack



When using ones micro, there is a tendency to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk. Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds up to eight 5.25" discs.

Protection at Only: **£2**

Acorn & Watford DFSs

- Watford sophisticated DFS ROM £16.00
- Watford DFS Kit complete £69.00
- We will exchange your existing ROM for Watford's ultimate DFS ROM at only £12.00
- DFS Manual (comprehensive) £6.95
- Acorn DNFS ROM £17.00
- Acorn ADFS ROM only £25.00
- Acorn 1772 DFS ROM Kit £49.00

(The single Density DFS system is now old technology. Like Acorn, Watford too have decided to replace it with the their more up-to-date 1770 DDFS interface. We have informed most of the software houses of this decision in order that they can ensure compatibility with our highly sophisticated and fully Acorn compatible DDFS).

Watford's MkII 1772

Single/Double Density DFS

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features.

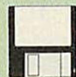
Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!
If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£39.00.**

- SPECIAL PRICE **£44.00**
- DDFS Manual (No VAT) **£6.95**
- We will exchange your existing DFS Kit for our sophisticated DDFS for only **£30.00**

Please note, as the MkII DDFS is a hardware and sofware upgrade, it is not possible for existing Watford DDFS users to simply exchange the ROM for the new version.



3M – Diskettes

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electonics your 3M Appointed Distributor

- *10 x 5.25" S/S D/D 40T (744)* £5
- *10 x 5.25" D/S D/D 40T (745)* £5
- *10 x 5.25" S/S D/D 80 Track (746)* £7
- *10 x 5.25" D/S D/D 80 Track (747)* £7
- *10 x 5.25" 1.6M D/S D/D High Density for IBM XT and AT* £9
- *10 x 3.5" S/S D/D 40/80 Track* £7
- *10 x 3.5" D/S D/D 40/80 Track* £7
- *10 x 3.5" Double Sided High Density* £13



Top Quality 3.5" & 5.25" Diskettes

To complement our range of Quality Discs and Disc Drives. WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

- *10 x **M3** 3.5" D/S D/D 80 Track* £7
- *10 x **M9** 3.5" D/S High Density* £12
- *10 x **M4** 5.25" S/S D/D 40 Track* £5
- *10 x **M5** 5.25" D/S D/D 40 Track* £5
- *10 x **M7** 5.25" D/S D/D 80 Track* £7
- *10 x **M8** 5.25" D/S H/D Hi-Density* £9
- ***M2** 3" Double Sided* £2.50 each



CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

Quality Disc Drives from Watford

All our Disc Drives are Double Sided and will operate in both Single and Double Density modes. All 5.25" Disc Drives are 40/80 track switchable. For ease of use, the switches are front mounted. Various UK "manufacturers" of disc drives for the BBC Micro (more accurately, "packagers" label other manufacturers drives with their own name). We buy the high quality NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

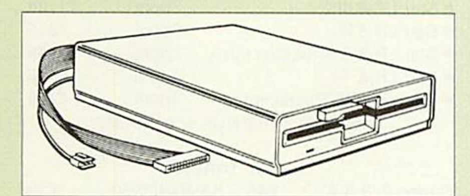
If you look around the popular BBC Micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

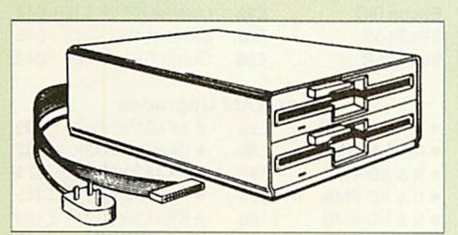
Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. ***Ideal for Schools & Colleges.***

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space. Your BBC Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double Plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with a Watford plinth. *(Turn to the 6th page of our advert for the Plinths).*

P.S. All our 5.25" Disc Drives with PSU are compatible with the Compact Micro. All you require is our special Compact Disc Drive cables designed by us.

"Test Bureau Approved for Use in Education"



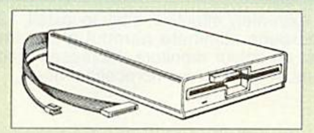


Our Disc Drives conform to BS415

Type	Description	
	Disc Drive without PSU	
•CLS400S:	Single, 40/80 track 400K Double sided Drive	£72
•CLD800S:	Twin, 40/80 track, 800K Double sided Drives	£142
	Disc Drive with PSU	
•CS400S:	Single, 40/80 track, 400K Double sided Drive	£82
•CD800S:	Twin, 40/80 track, 800K Double sided Drives	£155

Special Cable to connect both 3.5" and 5.25" Disc Drives simultaneously to the BBC Compact £13

Disc Drive/DDFS Offer



- The popular CLS400S 40/80 track switchable disc drive.
- Watford's popular Mk II DDFS Interface (allows up to 720K storage). Will run both in single & double density modes.
- A comprehensive DFS Operating manual

Bargain at Only **£116** (Offer valid until stocks last)

3.5" DISC DRIVE

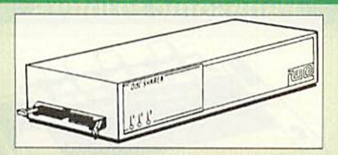


These top quality 3.5" Double sided, 80 track, are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

Type	Description	
	Disc Drive without PSU	
•CLS35:	Single Disc Drive, 400K	£62
•CLD400S:	Twin Disc Drives, 800K	£109
	Disc Drive with PSU	
•CS35:	Single Disc Drive, 400K	£83
•CD35:	Twin Disc Drives, 800K	£126

(P.S. CS35 is supplied in a twin case with a blanking plate to enable easy expansion to a dual drive at a later stage)

Disc Drive Sharer

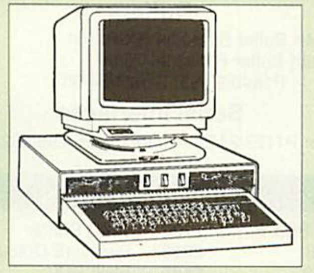


(Ideal for educational establishments)

A low cost alternative to the Econet system.Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC Micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Price includes 3 Cables £55

Disc Drives in Monitor Stand



•CDPM 800S – Twin 5.25", 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC B & Master 128K micros. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

£165

•DP35 800 – Same as above except, one disc drive is a 5.25" and the other is 3.5".

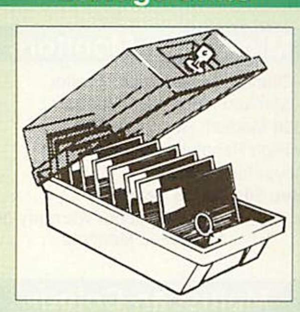
£154

Floppy Head Cleaner Kit

The heads in floppy drives are precision made and very sensitive to dirt. The use of Cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. it is very simple to use. Available in 3.5" & 5.25", please specify.

Price £4

Antistatic Lockable Disc Storage Units

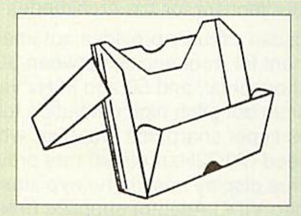


Gives double protection – Strong plastic case that affords real protection to your discs.
Antistatic helps avoid data corruption whilst in storage. The smoked top locks down.
Dividers and adhesive title strips are supplied for efficient filing of discs.

- **M35** – holds up to 50 5.25" discs £4.95
- **M85** – holds up to 95 5.25" discs £6.95
- **M25*** – holds up to 25 3.5" discs £4.95
- **M50** – holds 50 3.5" discs £6.50
- **M10** – holds 8 of No. 10 Data Cartridges £15

* Not lockable

Plastic Library Cases



Holds up to 10 x 3.5" Discs. £1.50
Holds up to 10 x 5.25" Discs. £2.00

Dust Covers (For our Disc Drives)

Single CLS (without PSU)	£3.20
Single CS (with PSU)	£3.25
Twin CLD (without PSU)	£3.85
Twin CD (with PSU)	£3.90

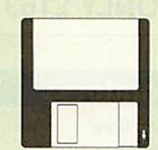
Disc Albums

Attractively finished in black leather-look vinyl. Stores up to 20 discs. Each disc can be seen through the clear view pocket.

£4

Special Bulk Offer on Discs

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

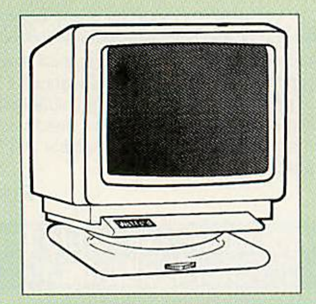




BULK PACK DISCS in lots of 100

Type	S/S 40T	D/S 40T	D/S 80T
• Without Sleeves 5.25"	£30	£35	£40
• With Sleeves 5.25"	£33	£38	£43
• 3.5" D/S D/D	£29 for 50		£52 for 100

Continued→ → → → → → → → → →



Microvitec Monitors

• **1431** – Standard Resolution Monitor	£169
• **1451** – Medium Resolution Monitor	£209
• **Cub3000** Medium Res for A3000	£189
• **1441** – High Resolution Monitor	£359
• Dust Cover for Microvitecs	£5.50
• **Touchtec 501 Touch Screen**	£239

Now 3 years Parts & Labour warranty on all Microvitec Monitors

Multiscan Colour

• Eizo 9060S	£389	• NEC 6FG	£1525
• Eizo 9070S	£579	• Taxan 770LR	£362
• NEC 3FG	£370	• Taxan 775	£366
• NEC 4FG	£465	• Taxan 795	£402
• NEC 5FG	£850	• Taxan 875	£669
• VIDC Enhancer Board			£25

(P.S. Taxan 795 monitor is supplied with a FREE VIDC enhancer board)



Aries AlphaScan Monitor

Pound for Pound, the AlphaScan VGA Multiscan monitor provides the maximum performance and greatest flexlbility of any 14" colour monitor for the Archimedes micro.

Its multiscan circuitry provides automatic adjustment for frequencies between 30 and 60KHz horizontal, and 50 and 90Hz vertical. Its 0.28mm dot pitch high resolution tube provides super sharp text graphics, while a high speed (70/72Hz) refresh rate provides a flicker-free display easing the eye strain. The Multivideo VIDC Adaptor supplied (free) with the monitor allows high resolution operation in all screen modes.

£325

Philips Monitors

• **BM7502** 12" Hi-res Green Monitor	£67
• **BM7522** 12" Hi-res Amber Monitor	£67
• **CM8833** 14" Med. Res Colour Monitor	£165
• TV Tuner for CM8833 Monitors	£62
Dust Cover for Philips Monitors	£6

STAR BUY

- **PHILIPS 14"** Medium Res, dark glass, attractively finished Colour Monitor. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £163

Refurbished Monitors

Philips 14" Refurbished Colour Monitors, same specification as the 'Star Buy' Monitors above — £119

(Offer valid while stocks last)

Spare Monitor Leads

BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for TAXAN Monitors	£3
Archimedes Colour Monitor Lead	£7.50

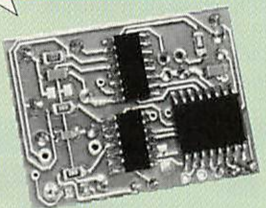
Anti Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for wordprocessor users.

£12



Watford VIDC Enhancer



This unique VIDC add-on board for the Archimedes, caters for all types of Multiscan and VGA monitor and mode requirements. There are 2 versions to suit all requirements. The multimode software supplied, provides all the new modes for the selected monitor type, including the now standard Computer Concepts modes. With VGA monitor, you are no longer restricted to a few modes. A WIMP application supplied on disc, allows new modes to be designed and existing modes to be modified for particular monitors.

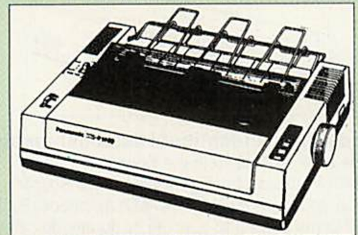
Super VGA VIDC Card: This provides support for both VGA and Multisync monitors. A unique electronic design allows the horizontal and vertical sync to be buffered and have the polarity changed under software control

£45

MultiVideo VIDC Card: As above but for MultiScan monitors only.

£25

Panasonic Printers



• **KX-P1123**	£133	• **KX-P1624**	£278
• **KX-P1124i**	£177	• **KX-P1654**	*£385
• **KX-P1170**	£105	• **KX-P1695**	£278
• **KX-P1180**	£96	• **KX-P2624**	*£355

*** Price includes 12 months On-site warranty**

Panasonic Accessories

Cut Sheet Feeders

P36 – 1124/24i	£79	**P37** – 1123/70/80	£69
P38 – P1624/95; P2624			£129

Buffers

P12 4K Buffer Board for KX-P1081	£55
32K Buffer P1123/24/70/80 P1540/92/95; P1624/54/95	£16

Serial Interfaces

P19 for P1123/24/24i/70/80/1624/54/95/2624	£49

Citizen Printers

120D Plus	£100	124D Printer	£145
PN-48	£209	Swift 24E Colour	£249
Swift 9	£145	Swift 24X	£299
• Prodot Cut Sheet Feeder			£120
• Swift 24 Colour Option			£29
• Swift 24 Ribbons	Black £4		Colour £13
• Swift 24X Cut Sheet Feeder			£125

Integrex Colour Jet

• Colour Jet 132 Printer	£475
• Paper Roll	£6.50
• BBC Screen Dump Software	£10
• Colour Cartridge	£21
• Black Cartridge	£12.40
• 100 A4 OHP transparencies	£55
• 8K Serial Interface Optional	£123

Star Printers

• LC15	£173	• LC200 Colour	£146
• LC20	£103	• SJ48 Inkjet	£179
• LC24-10	£137	• XB24-200 Colour	£299
• LC24-15	£275	• XB24-250 Colour	£359
• LC24-200	£168	• XB24 Colour kit	£29
• LC24-200 Colour	£207	• ZA200 Colour	£236

Star Accessories

Cut Sheet Feeder

LC10/200/24-10	£65	LC15/LC24-15	£125
XB24-10	£80	XB24-15	£139

Serial Interfaces

SPC-10 LC10; LC10-II; LC10-Col; LC15; LC24-10; LC24-15; LC-200; LC24-200	£49
8K Ser LC-200; LC24-200; FR10; FR15; XB24-10; XB24-15	£64

Paper Roll Holders

LC-200; LC24-200; LC24-200 colour — £29

Buffers

32K Ram Card for LC/XB24-10; 15; LC200 — £55

Ribbons

LC10; LC10-II; LC15	Black **£4;**	Colour **£6**
LC-200; LC24-200	Black **£5;**	Colour **£12**
XB24-10; XB24-15	Black **£5;**	Colour **£12**

Laser Printers

All Laser Printers include 12 months On-site maintenance

• Canon LBP-4+	4ppm	£575
• Canon LBP-8 III	8ppm	£975
• Canon LBP-8 IIIR	8ppm	£1445
• Canon LBP-8 IIIT	8ppm	£1345
• Epson EPL4100	6ppm	£575
• Epson EPL7500	6ppm	£1165
• HP Laserjet III	8ppm	£1015
• HP Laserjet IIID	8ppm	£1720
• HP Laserjet IIIP	4ppm	£705
• HP Laserjet IIISi	4ppm	£2475
• HP Laserjet IIIsi	16ppm	£2475
• Panasonic KX-P4420	8ppm*	£629
• Panasonic KX-P4450i*	11ppm*	£945
• Panasonic KX-4455 Postscript	11ppm*	£1455
• Star LP-8 III 2	8ppm	£1249
• Star LP-8 III	8ppm	£915
• Star LP-8 Star(post)script	8ppm	£1149
• Star LP-4	4ppm	£565
• Star LP-4PS Postscript	4ppm	£779

* Now with 2 years On-site warranty

Laser Toners

Canon 2, 3 & 4	£46	KX-P4420/50	£19
Epson GQ	£13	Laserjet HP IIP & IIIP	£42
EPL7100	£82	Laserjet II/D, III/D	£48
Star LP-8	£56	Qume Crystal (3)	£42

Laser RAM Upgrades

• IIP & III 1MB	£56	• EPL7100 256K	£39
• IIP & III 2MB	£88	• GQ5000 512K	£42
• II & IID 1MB	£64	• KX4420/50 1M	£75
• II & IID 2MB	£99	• KX4420/50 2M	£115
• II & IID 4MB	£146	• KX4420/50 4M	£195
• Canon LBP4 1M	£105	• Star LP8 1M	£139
• Canon LBP8 2M	£125	• Star LP8 2M	£275

Laser Drum & Developer

• Epson Drum GQ5000	£93	EPL7100	£129
• Panasonic 4420 Drum	£60	Developer	£59
• Panasonic 4450 Drum	£93	Developer	£80
• Qume Drum	£76	Developer	£56

Jetpage Postscript Cartridge

• HP IIP/III	£239	IID & IIID	£240

Various Add-Ons

Laserjet Appletalk Interface	£139
HP Adobe Postscript	£399
Jetpage Postscript for Laserjet 2	£235
Jetpage Postscript for HP 2P/3	£229
Pacific Page Postscript	£259
HP Premier Font Collection	£28
Jetfont Superset for II & IID	£129
JF Superset International for IIP & III	£145

Hewlett-Packard Printers

- # Desk Jet 500 **£275**
- Paintjet XL **£1089**
- Desk Jet 500 Col. **£499**
- Quiet Jet Plus **£384**
- Desk Jet Cartridge **£14**
- HP Think Jet **£265**
- Paint Jet Colour **£435**

Now 3 years extended Parts & Labour warranty

- Paintjet Cartridges Black **£19**; Colour **£25**
- Desk Jet 500 256K RAM cartridge **£129**
- HP Epson FX Emulation Cartridge for Desk Jet **£59**
- Desk Jet Unlimited (Book No VAT) **£19.75**

Canon Bubblejet Printers

	Printer	CSF	D'ble Bin	Ink Cart
BJ10EX	£192	£43		£16
BJ300	£340	£88	£65	£12
BJ330	£385	£110	£79	£12

- Spare Battery pack for BJ10E **£33**

NEC Pinwriter Printers

- P20 **£176**
- P70 **£403**
- P30 **£214**
- P90 **£599**
- P60 **£324**

Cut Sheet Feeders

P20 **£59**; P30 **£75**; P60 **£85**; P70 **£129**

Epson Printers

DFX5000	**£1069**	LQ1060 Colour	**£599**
DFX8000	**£1949**	LQ1070	**£322**
FX850	**£268**	LQ1170	**£438**
FX1050	**£342**	LQ2550+	**£679**
LQ200	**£155**	LX400	**£104**
LQ450	**£172**	LX850	**£144**
LQ570	**£210**	LX1050	**£219**
LQ860 Colour	**£449**	SQ850	**£432**
LQ870	**£369**	SQ2550	**£635**

Cut Sheet Feeders for

LX400/800/850/LQ400/500/550 **£69**
EX800/FX800/850/LQ800/850 **£130**
FX/LQ 1000/1050/SQ850 **£159**
LQ 2550 **£390** SQ2550 **£390**

Tractor Feed for

LQ800 **£44**; LQ850/FX850 **£69**; LQ1050/FX1050 **£85**; LQ2500 **£90**; LQ2550 **£90.**

Accessories

- EX800/1000 Colour Option **£45**
- EX800/1000 Colour Ribbon **£14**
- LQ2500 Colour Option **£65**
- Multifont Card for LQ550/850/1050 **£95**

Epson Printer Interfaces

All these interfaces fit inside the printer

RS232 **£28** RS232 + 2K Buffer **£52**

Printer Leads

BBC Centronics 4' long	**£5**
BBC Centronics 6' extra long	**£7**
Compact's Special Centronics Lead	**£7**
Nimbus Centronics Lead	**£6**
IBM/Archimedes Parallel Lead 6'	**£4**
IBM/Archimedes Parallel Lead 5 metres	**£10**
IBM/Archimedes Parallel Lead 10 metres	**£15**
Double Ended 36 way Centronics Lead 4'	**£7**
Double Ended 36 way Centronics Lead 6'	**£9**
MSX Centronics Parallel Lead 4'	**£12**
RS232 Leads (Various)	**P.O.A.**
IBM Keyboard extension lead coiled	**£5**

Concept Keyboards

Standard A3 Keyboard with BBC Software	**£143**
Standard A4 Keyboard with BBC Software	**£117**
Archi A3 Keyboard	**£144**
Archi A4 Keyboard	**£118**

Plotters

- HP7440A **£415**
- HP7475A **£592**

Roland Plotters

- DXY1100 **£499**
- DXY1200 **£629**
- DXY1300 **£830**
- DXY2500 **£2349**
- DPX3500 **£3289**
- Sketchmate **£315**
- Roland plotter Pens, Fibre tip **£7.50**

Listing Paper (Perforated)

- 1,000 Sheets 9.5" x 11" Fanfold Paper **£7**
- 2,000 Sheets 9.5" x 11" Fanfold Paper **£11**
- 1,000 Sheets 9.5" x 11" NCR 2 Part Fanfold **£21**
- 1,000 Sheets 15" x 11" Fanfold Paper **£9**
- 2,000 Sheets 15" x 11" Fanfold Paper **£16**
- 1,000 Sheets true A4 Fanfold Paper 70gms **£11**
- 2,000 Sheets true A4 Fanfold Paper 70gms **£21**
- Teleprinter Roll (Econo paper) **£4**

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50, 2K Sheets £3.00

Printer Labels

(On continuous fanfold backing sheet)

1,000 90 x 36mm (Single Row)	**£6.00**
1,000 90 x 36mm (Twin Row)	**£6.25**
1,000 90 x 49mm (Twin Row)	**£7.50**
1,000 102 x 36mm (Twin Row)	**£6.75**

Laser Printer Labels on A4 Sheets

3750 70 x 29mm (3 Rows)	**£13.50**
3000 70 x 37mm (3 Rows)	**£13.25**
2625 70 x 42mm (3 Rows)	**£13.00**

Printer Ribbons & Various Dust Covers

Type	Ribbons	Dust Covers
BBC Micro	–	**£3.50**
BBC Master	–	**£4.00**
Archimedes Micro pair	–	**£9.00**
Citizen 120D	**£2.75**	**£4.50**
DMP2000	**£2.75**	**£4.75**
DMP4000	**£3.75**	**£4.85**
EX800/1000	**£3.50**	**£5.00**
RX/FX80/85/800/MX80	**£2.95**	–
FX/MX/RX100/1000	**£3.95**	–
Kaga/Taxan KP810/815	**£3.25**	**£5.00**
LQ400/500/550/800/850	**£3.25**	**£6.00**
LQ1050/LQ2500	**£4.00**	–
LX80/86/800/850	**£2.75**	**£4.50**
LX400	**£3.50**	**£5.00**
M1009/GLP	**£2.95**	**£3.75**
NEC P2200	**£4.50**	**£5.00**
Panasonic KX1080/81	**£3.25**	**£4.75**
Panasonic KX-P1124	**£7.00**	**£5.00**
Star LC24-10	**£2.95**	**£6.00**
Olivetti Ink Jet Cartridges (set of 4)	**£6**	

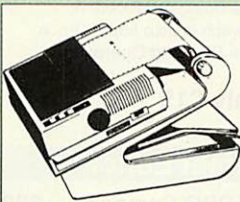
Original Panasonic Ribbons

Guaranteed to last 3 million characters

P110 for KX-P1081, 1592 & 1595 **£6**
P115 for KX-P1180 **£7** **P145** for KX-P1124 **£7**
P140 for KX-P1540 **£8** **P155** for KX-P1624 **£8**

Colour Ribbons for KX-P1081, 1592 & 1595
Brown, Blue or Red **£9 each**

Professional Printer Stand



The professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Its ergonomic design ensures smooth paper flow and automatic refolding.

80 Column version £24 (carr. £3)
132 Column version £29(carr. £4)

Universal Printer Sharers/Changer

Connect up to 5 Micros to 1 printer or 5 printers to 1 Micro with our combined, Sharer/Changer switch boxes.

Standard Low Cost Type

Connects	Serial	Parallel
• 2 to 1	£10	£11
• 3 to 1	£13	£14
• 5 to 1	£16	£17

Professional Type

Connects	Serial	Parallel
• 2 to 1	£17	£18
• 3 to 1	£22	£25
• 5 to 1	£34	£38

2 Way Compact Printer Switch

A handy 2 way printer switch. Enables one micro to be connected to 2 printers or vice versa.
Parallel **£18**; Serial **£17**
(Cables extra at £6 each)

Auto Printer Sharer Switch

Connects	Serial	Parallel
2 to 1	£40	£45
4 to 1	£62	£49
8 to 1	–	£89

256k Multi Spooler

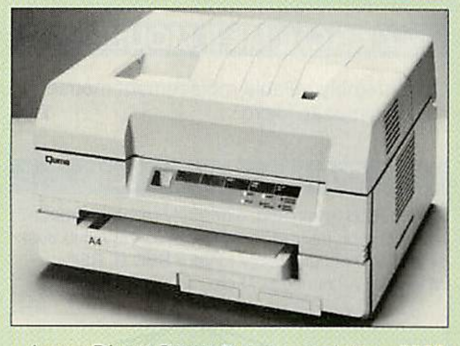
These Auto Parallel Printer Sharers have built-in 256K of Printer Buffers. They can be used as Auto Sharers, Printer Buffers or both.

- 2 In/2 out **£135**
- 4 In/2 out **£169**
- 8 In/1 out **£199**

Compact Converter Units

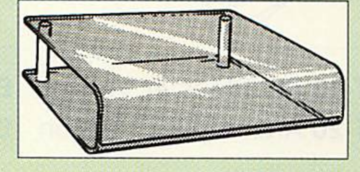
Serial to Parallel **£36** Parallel to Serial **£37**

Laser Direct



- Laser Direct Qume 6ppm complete **£825**
- Special High Res Card 600 DPI for Canon LPB 4 & LPB 8 Laser Printers **£325**
- LPB 4 Printer plus High Res Card **£899**
- LPB 8III Printer plus High Res Card **£1299**

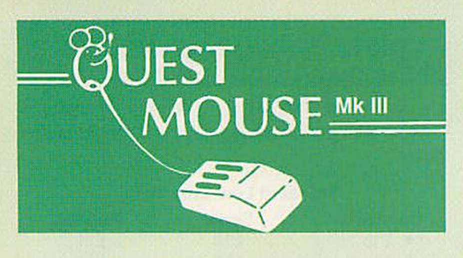
Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand.

80 Column version **£16** (carr £3)
136 Column version **£20** (carr £4)

Continued→ → → → → → → → → →



- Quest Mouse III & Quest Paint £59
- Quest Mouse III, Quest Paint, AMX Stop Press & Pagefont £89
- Quest Mouse III only £30
- Quest Paint Software only £34
- Quest Font Disc (22 Text Fonts) £15
- Quest Mouse Mat (Red or Blue or Green please specify) £3
- Quest Colour Dump Disc – This new software allows you to print direct from Quest Paint to your Integrex Colour Printer £18

(P.S. Quest Paint is not compatible with BBC Compact)

Quest Paint is the winner of the BBC Acorn User 1990 Award for the Best Art/Graphics software



Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

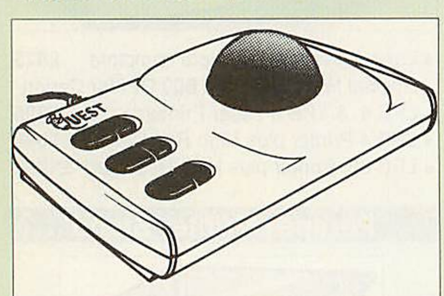
ConQuest ROM Package £30
(Price includes software in ROM and a comprehensive Manual).
(Not Compatible with BBC Compact)

ARCHI Mk II MOUSE

An extremely reliable replacement mouse for Archimedes Micro £32

Quest – Tracer ball

An attractively finished, extremely reliable, mouse replacement, input device. Requires very little desk space. Connects directly to your BBC B, BBC Master or Archimedes Micro.



QT-10 BBC/Master Version **£27**
QT-20 Archimedes Version **£30**

RB2 Marconi TRACKER BALL

RB2 (AMX/Quest compatible) £45
RB2 including Quest Paint £75
RB2-A for Archimedes £46

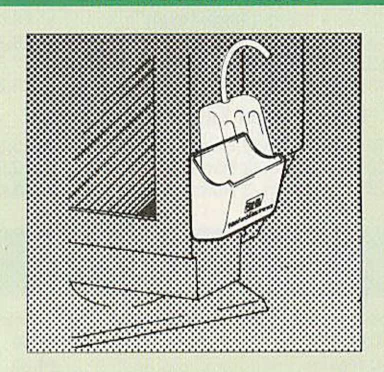
THE NEW Mk III AMX MOUSE

- **AMX Mouse plus Super Art £54**

(Please specify for BBC, Master or Compact)

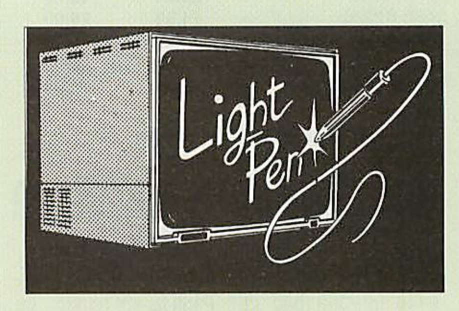
- AMX MOUSE ONLY £29
- AMX SUPERART Package £29
- AMX STOP PRESS – A Desktop publishing software. Works with Keyboard, Joystick or a mouse £25
- PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker £13
- AMX DESIGN (ROM) £34
- AMX XAM Educational £15
- AMX EXTRA EXTRA £16
- AMX MAX A gem of desktop (ROM) £20
- MOUSE MAT £3

WE Mouse House



Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, monitor, disc drive or desk.
It protects it from damage when not in use, yet within easy reach when you need it again. At £4 it does not cost a rodent's ransom.

Price £3



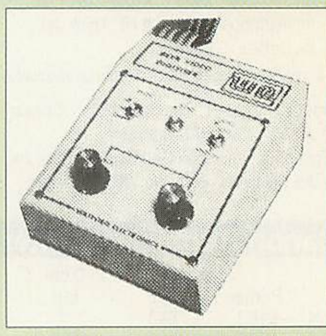
Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted. (Price includes FREE software Disc and Operating Manual)

Only £19

Fleet Street Editor

Software pack for BBC Compact £22
Fonts N Graphics Disc Utility £13
XTRA Admin £12
Walt Disney £12

BEEB VIDEO DIGITISER



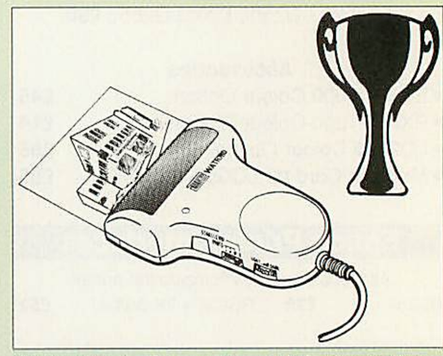
"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro. This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket. The software supplied includes a sophisticated, fast screen dump routine.
Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem. The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

£109 (Carr. £5)
(BBC B+ and Master compatible, except Master with Econet)
(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)

The Beeb HandScan

Hand-held Scanner for the BBC Micro



Watford Electronics are pleased to announce the launch of the first hand held scanner for the BBC Micro. HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs! These useful devices have been available for faster and more expensive micros for some time, but only now is Watford Electronics able to offer the BBC Micro computer.
The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilities provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various types of dithering may be selected to simulate the grey levels of a scanned picture.
All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

Beeb HandScan & Firmware **£135**



Winner of the BBC Acorn User 1990 Award for the Best DTP/Word Processor

The Wapping Editor

The Wapping Editor from Watford Electronics represents a breakthrough in Desktop Publishing for the Beeb. The package includes a 64K ROM containing ALL the software needed to get into print fast; a very sophisticated graphics module, professional quality typesetting software, a word processor, a comprehensive font editor for designing your own typefaces, and a variety of printer dumps. This mouse-driven system is designed for the BBC B, the B+ and Master computers and will take full advantage of any Sideways and Shadow RAM that may be fitted. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Included with the system is a utility disc containing several high quality fonts, various utilities and a ROM image of a Support ROM. A comprehensive 100 page manual completes the package. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GXR). Another of the features of the Support ROM is a 'Turbo DFS' which gives DFS access times comparable with those of ADFS.

Page Layout Section

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program may be used to create pages to your own requirements. By using proportionally spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page. A unique feature of the Wapping Editor is the 'A5 x 2' page size allowing two A5 pages to be printed side by side onto a single A4 sheet.

The graphics module incorporates the facilities like: pencil, brush, airbrush, polygon, circle, eclipse, fill, cut & paste, etc.

Text may be typeset, either justified or unjustified, in any font anywhere on the page. Simply select which font and text document you wish to use, and pull out a rectangle on the page where you want the text to be – it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature may be used to expand the microspacing so that the document exactly fits the space defined.

Word-Processor

The integral word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc.

The Font Editor

The font editor module will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions designed to take the tedium and frustration out of producing good looking, well balanced fonts. Each character may be individually proportionally spaced and characters of any size up to 16 x 16 pixels may be defined.

Pictures may also be 'grabbed' from a video source by using the Watford BEEB Video Digitiser.

Wapping Editor Software Pack	**£59**
Wapping Editor plus Mouse	**£79**

(Wapping Editor only works with Master Compact if a Mertec Expansion box is fitted)

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games etc.

Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out.

Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.

There are two prepared hi-res pages layed out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.

A Mode 0 screen dump routine is also included. To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routine you can archive large numbers of screens onto a single disc.

£15

Wapping Font Disc 1

Sixteen additional fonts, including smaller version of Oberon and Daisy and two new sizes of the standard font for the Wapping editor.

Also included are three Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines.

Supplied complete with instructions.

£12

Wapping Font Disc 2

This new addition to our Wapping range of DTP software provides you with additional 23 fonts for the Wapping Editor DTP pack. (80 track discs only).

£13

Archi A4 Scanner



This most advanced Archi A4 image scanner is supplied complete with ROM based podule software. Features provided include facilities for zooming in on an image and inverting the image in X and Y directions, saving and printing of the sprite created. Interactive help is supplied using the !HELP application on the Acorn applications discs. The 216mm scanning width can cope with both desktop scanning of single sheets, photographs, diagrams, etc., with its fast ten page automatic document feeder, but it can also detach from the feeder to become a convenient hand-held full page scanner for larger documents or pictures.

Scanned image control can be freely adjusted in increments of 10 dots per inch from 100 up to 400 dpi resolution with 64 levels of grey scaling. A built in shading controller and manual brightness control achieve optimum image clarity.

Unlike some scanners, which use a red light source, the Watford scanner uses a yellow/green source which vastly improves the light/dark contrast, thus eliminating the effect where any red-based colours are faded down to white and so do not show up in the scanned image.

All these features and facilities combine to make the Archi Page Scanner the fast and convenient way in which to add that extra impact, interest and clarity to documents, reports, instruction sheets, manuals, news letters, etc., from your Archimedes DTP package.

New Low Prices:

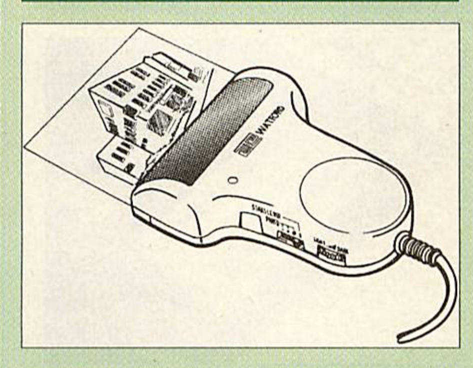
Archi A4 Scanner	£349
Sheet Feeder for above	£95
Scanner + Sheet Feeder	£419

(Dealers Inquiry welcome)

Computer Concept Scanlight

• Scan-Light A4	£375
• Scan-Light A4 + Sheet Feeder	£475
• Scan-Light Junior mono	£178
• Scan-Light Junior 256	£215

Archi Mk II Hand Scanner



Watford Electronics is now able to offer a complete hand held scanning package, possibly the most essential addition to any desk top publishing system, for only £149. The package includes the most comprehensive utility software available for the Archimedes, a high quality hand held scanner, and all necessary documentation to get you going straight away.

SCANNER

The scanner is capable of scanning up to an amazing 400 dots per inch (DPI)! The scanning area is 4" wide, and the height is only limited by the maximum amount of memory available. The dot resolution may be switched to 100, 200, 300 or the maximum 400 dpi. One of four operating modes may be selected offering either pure monochrome scanning, or one of three grey level modes. The grey level modes use different size dither patterns to represent up to 16 shades of grey. There is also a dial to allow the "brightness" to be adjusted over a wide range, in order to optimise the quality for any specific image. The scanner interface is a standard, single width, expansion card (podule) which plugs into the Archimedes' backplane. The socket on the rear panel connects the scanner by 1.8 metres of cable.

SCANNER SOFTWARE

Full use is made of the windowing and the multi-tasking facilities of RiscOS. The software is supplied in a 64Kbyte ROM located on the interface board. The scanner appears as a small icon on the desktop icon bar, and the software is retrieved from the ROM simply by clicking on that icon. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. The other facilities included in the software are.

Cropping and scaling to any size including stretching and squashing in X and Y direction separately.

Colour tinting.
X and Y flip.

Edge detection which turns solid objects into outlines.

Selective directional copying which allows features (i.e. lines or text) to be made thicker or thinner.

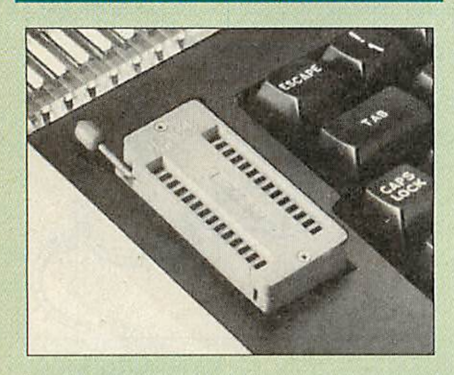
Scanned images may be saved as sprite files or transferred directly into other RiscOS applications (DTP, Draw, Paint) simply by dragging the sprite file into the application's window. Sprites may also be generated using anti-aliasing. This greatly improves picture quality and is particularly effective when scanning material with a range of grey tones, such as photographs. Images can be printed on any printer that is supported by a RiscOS printer driver, with optional settings for portrait or landscape modes, image scale and positioning. Images are printed using the full resolution of the printer and are not limited to the screen resolution.

On-screen help is provided via the RiscOS interactive help facility. Calls are also provided in the ROM for users wishing to write their own software, incorporating the use of the scanner.

AHS-4 Archi 300/400 Version	**£149**
AHS-3 Archi A3000 Version	**£169**

Continued→ → → → → → → → → →

Sideways ROM ZIF Socket System



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for professionals and Hobbyists alike.)
- BBC, B and B+ compatible.

ONLY **£18**

BBC B Low Profile Cartridge System

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

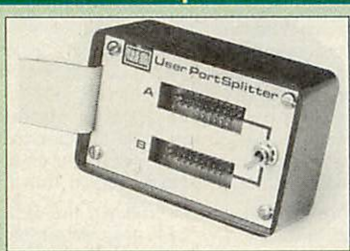
• Complete System	£11
• Spare Cartridges	£2.75
• Spare Rack	£1.65

ROM Cartridges for the BBC Master

Will also accept the new larger Piggy Back ROMs like: Interword, Interbase, Quest, Conquest, etc

Twin **£8**; Quad **£13**

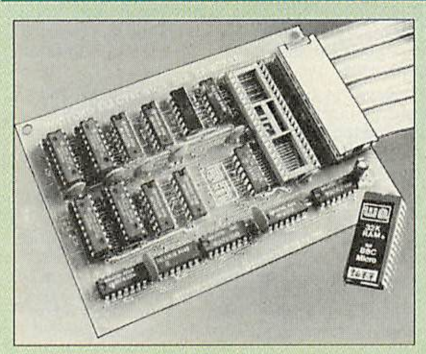
User Port Splitter Unit



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaneously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination

Excellent Value at **£22**

32K Shadow RAM/Printer Buffer Card Expansion Board



A MUST FOR WORD PROCESSING

Simply plug the ribbon cable plug into the 6502 socket and gain a massive 32K of extra RAM.

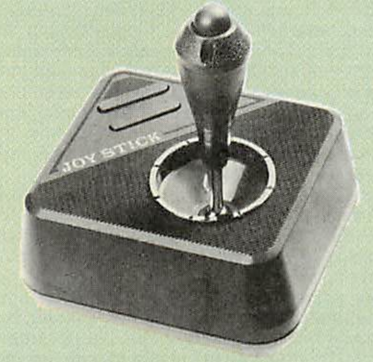
- While word processing, you don't wait for a slow printer, type in text while printing and save on expensive printer buffers.
- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28K bytes free – 5 times as much as normal.
- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24k of text in memory. This product is recommended as an ideal complement by Computer Concepts.
- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20k of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28k of program space.
- Use the full 32k or the bottom 12K of the expansion RAM as a printer Buffer. (P.S. Only 12K printer buffer can be used with Wordwise & WW+, due to the way they are written).
- Unique facility to turn ROMs off and on again.

Only £54

(Price includes a comprehensive manual and the ROM)



Commander Joystick

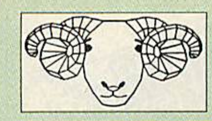


Watford Electronics' new Commander Joystick for the BBC B and Master 128K has a unique dual mode of operation giving selective free floating or self centring fully variable control in both X and Y axis directions. Commander is particularly good for flight simulation and drawing programs.

Features:

- Direct connection to BBC Analogue input port – no interface needed.
- Fully compatible with all BBC Joystick controlled games programmes.
- Switchable springs allow selection of floating or centring operation.
- Trim adjusters for both X and Y axes for fine centre adjustment.
- Convenient stick mounted fire button with additional base buttons.

Price: £15



ARIES CORNER

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Cobal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved ★FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on you BBC micro – no flying leads to connect and no soldering. Provision of the onboard ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£59**

Aries B-12 Sideways ROM Board

The B-12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost

Price:	Aries B-12	£36
	Aries B-12C	£5

Aries B-488 IEEE-488 Interface Unit

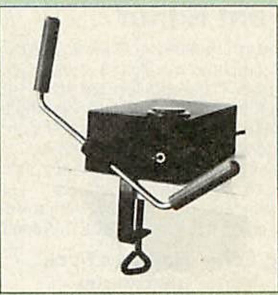
The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB or 'HP IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238

Voltmace Joysticks

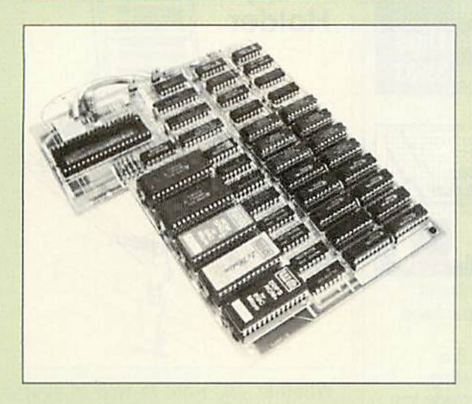
Delta 3B Single Joystick	£10
Delta 3B Twin Joysticks	£15
Delta 3C Joystick for Compact	£10
Delta 14B Single Joystick	£11
Delta 14B/1 Adaptor Module	£12
Transfer Software Disc-Tape	£7
Delta-Cat A mouse eliminator Joystick for the Archimedes	£24

Delta Base B



Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128 **£25**

ROM/RAM Card



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 9 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, Watford's ROM/RAM card.

- NO SOLDERING required to fit the board.
- NO User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Compatible with BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROMSPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

PRICES:

- ROM/RAM card with 32k DRAM £45
- ROM/RAM card with 64k DRAM £59
- ROM/RAM card with a massive 128k DRAM £99

OPTIONAL EXTRAS:

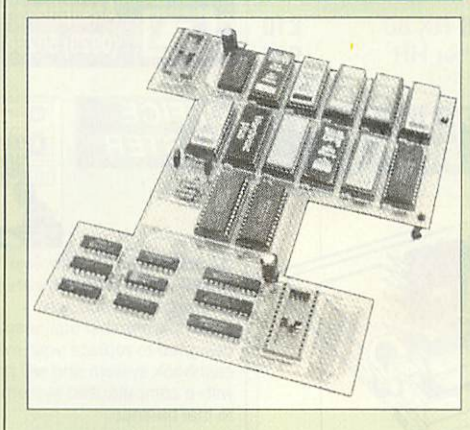
- 16k plug-in Static RAM kit £8
- 16k DRAM for Upgrade £13
- Battery backup £3
- Read and Write protect switches £2 each

Complete ROM-RAM card with all options fitted £109



CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

Solderless Sideways ROM Socket Board



The key features of this no fuss, easy to install card are:

- Increases your BBC Micro's ROM capacity from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £35
Battery Backup fitted **£39**
Battery Backup only **£3**
16K Sideways RAM **£8**

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer. **Only: £8**

BBC Educational Software

- Maths with a Story 1 (Disc). 4 primary level maths programs £20.00
- Maths with a Story 2 (Disc). 4 further maths programs. £20.00
- Picture Craft (Disc) 6-14 age group. Pack consists of flexible geometrical design & colouring programs. £17.00
- ECOLOGY O-Level program. £20.00
- POLYMERS O-Level program. £20.00
- Classification & Periodic Table O-Level. The suite is supplied with its own database of chemical elements which can be classified according to your own rule. £20.00
- ADVANCED TELETEXT SYSTEM £8.65
- PERIOD TABLE SOFTWARE £20.00
- Computers at Work – Primary £17.35
- Introducing Geography 11-17 years £17.50
- Electric Fields 6-14 years £11.25
- Espana Viva – 3 Discs £19.95
- WHITE KNIGHT Chess game £16.00
- A Vous La France £29.00
- **FUN SCHOOL 2 – Red:** Under 6 yrs £12.00
- **FUN SCHOOL 2 – Green:** 6-8 yrs £12.25
- **FUN SCHOOL 2 – Blue:** 8 yrs+ . £12.50
- **FUN SCHOOL 3 – Red** £18.50
- **FUN SCHOOL 3 – Green** £18.50
- **FUN SCHOOL 3 – Blue** £18.50
- Six French Games – Aimed at pupils in their first year of French, but also useful as revision for more advanced students 11 years+ £26
- More French Games – Another 6 games 12 years+ £26
- Au Restaurant and Accident de Route 12 years+ £26
- Boulogne and Oh-Les – 2 programs for beginners £26
- Letters to French Penpals – 11 years+ £26
- French Programs with Henri Beret – The programs in this series present vocabulary, grammar and role-play phrases in the form of animated games. 11-16 £22
- Six German Games – Aimed at pupils in their first year, but useful as revision for more advanced student of German. 12 years+ £22
- More German Games – Aimed at pupils in their 2nd year of learning German. 12 years+ £22
- The Cloze Program – Using context clues to predict is much more than a gap filling exercise. All ages £26
- An Introduction to Electronics – Brings together all the basic electronics required for a GCSE Physics or CDT course. 14-16 years £26
- Computer Control – This is a package of 3 programs simulating control of a greenhouse, a robotic arm & a chemical plant. 14-16 years £26
- The Nuclear Reactor – An interactive, menu driven program for GCSE pupils. Demonstrates & explains nuclear fission & the chain reaction. 14-16 years £22
- PUNCMAN Learning punctuation
  Puncman 1 & 2 for 7 – 13 years £15
  Puncman 3 & 4 for 8 – 14 years £15
  Puncman 5 & 6 for 8 – 15 years £15
- Yes Chancellor – A chance to take over number 11 at Downing Street. 12 years+ £18
- Letters & Pictures – Introduces phonic skills to Infants 6-8 years £15
- Numbers & Pictures – Early number learning is a great fun (4-6 years) £15
- Note Invaders – Budding musicians can learn the notes on the Clef with this elegant game 3 programs (7 to Adults) £15
- Maps & landscapes No. 1 (9-14 years) £18
- Help Your Child learn Basic Map work No. 2 (9-14 years) £18
- Pirate – Educational Adventure (8-14 years) £15
- Spelling Week by Week (6-14 years) £18

Archimedes Software

- Animated Alphabet (3-6 yrs) £21
- Arcventure (8-12 yrs) £29
- Bookbinder £43
- Bumper Disc £14
- Bumper Disc 2 £14
- Craftshop 1 £26
- Craftshop 2 £26
- Christmas Allsorts – Clip Art (6-16 yrs) £16
- Converta-Key £16
- Data Word £16
- Desktop Stories £35
- DigiSim £35
- Dream Time (5-7 yrs) £23
- Droom £19
- Farm (5-7 yrs) £19
- Fleet Street Phantom (9-13 yrs) £25
- Fun School 2A Red (up to 6 years) £12
- Fun School 2A Green (6-8 years) £14
- Fun School 2A Blue (8 years +) £14
- Gate Array Teaching System £68
- Glimpse Clip Art Utility (7-16 yrs) £8
- Highlighter (6-16 yrs) £42
- Jiglet £27
- Jigsaw £28
- Mapventure (9-13 yrs) £24
- Microbugs £24
- Money Matters £16
- Nature Park Adventure (7-9 yrs) £27
- Numerator £60
- Picture Book £16
- Recall (6-13 yrs) £39
- Sellardore Tales £24
- Snippet £26
- Space Mission Mada (9-13 yrs) –
- Sting of the Dump (9-13 yrs) £22
- Target Maths £16
- Viewpoints (9-12 yrs) £33
- Wizard's Revenge (7-10 yrs) £17
- Worst Witch (7-10 yrs) £25

Continued→ → → → → → → → →

Computer Concept's ROMS

Communicator	£49
Disc Doctor	£18
Inter BASE	£49
Inter CHART	£25
Inter SHEET	£37
Inter WORD	£36
Mega-3 ROM	£76
Spell Master	£42
Wordwise	£24

Wordwise plus

£40

We are giving away absolutely **FREE,** the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear test-segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc interface in your Micro)

Acorn ROMS

View 3.0 ROM	£45
Viewsheet (Acornsoft)	£36
Viewstore	£36
Viewspell with 80 track disc	£25
Viewplot Disc	£20
(Please specify for Master 128 or Compact)	
View-Index	£12
Overview packs 1 & 2	£65
Hi-View	£38

MINI OFFICE II

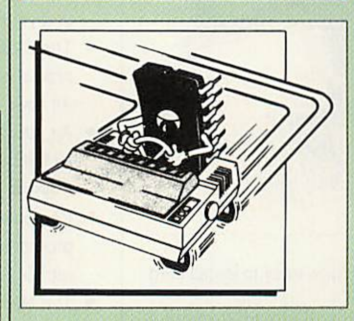
DISC Version for BBC B & B+	£14.00
DISC Version for BBC Master	£16.00
DISC Version for the Compact	£18.00

(When ordering please specify for which Micro & 40 or 80 track Disc)

View Printer Driver Discs

Epson FX & RX 80	£10
Juki & Brother HR	£10

View Printer Driver ROM



View is a powerful word processor, but it seriously lacks in terms of printer driver support. With the View Printer Driver ROM, the View users will find themselves in the realms of advanced word processing.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built-in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redifinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute ★ command when printing.

Other features include a very powerful on-screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory-based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips.

Price: Only £29



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- BEEBPLOT GRAPHICS

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SPREADSHEET – Offers many calculation and editing features

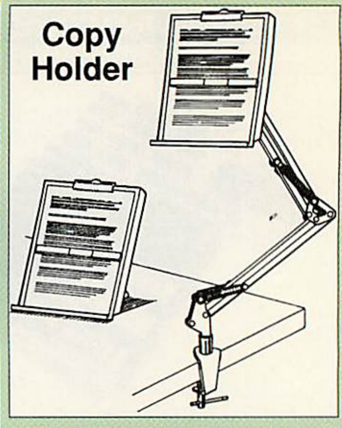
BEEBPLOT – Provides visual representation from Spreadsheet data.

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Special Offer £14

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The Epson RX/FX/KAGA Printer Commands Revealed Handbook

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out? Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from Basic and Wordwise.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

£5.95 (No VAT)

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New Release
ACORN TO PC
Stop the Confusion!

Do you have to use both Acorn computers and PC's? Would you like to use your Archimedes or A3000 in PC-emulation mode but are unsure of the new commands?

Although Acorn machines (such as the BBC B, the Master, the Archimedes and the BBC A3000) are mainly used in education, most commercial computers use other operating systems, particularly MS-DOS. As a result school computer users are at a disadvantage when moving into 'business' computing. PCs and other commercial computers use MS-DOS as the operating system, so commands for formatting, copying, backing up, printing and the modem are not the same. Even file names are written differently! And did you know that there is one Acorn command which, if used in MS-DOS, wipes everything in the current directory?

'ACORN TO PC' enables you to change over painlessly. It shows clearly and quicly how, why and where the two systems (Acorn and MS-DOS) differ. As with a foreign language dictionary, you can use the book to transfer either way – from Acorn to MS-DOS, or from MS-DOS to Acorn.

'ACORN TO PC' also acts as a handy reference guide to all Acorn star commands and their MS-DOS equivalents. It also has an extensive and readable explanation of the directory tree and hierarchical filing systems in general. Both DFS and ADFS Acorn systems are covered.

'ACORN TO PC' is written clearly and concisely by Dr. John Lockley, who has wide experience of writing and broadcasting. He is currently appearing as a regular contributor on Radio 5, and is co-author of 'The Complete BBC Computer User Handbook'.

Price: £12.95 (No VAT)

The Complete BBC Computer User Handbook

If you own a BBC B, B+, Electron, Master 128 or Master Compact, or Archimedes, then this is the book for you. It shows how to get the best from your machine, and how to make it work for you. The general style and level of presentation means that both the expert and beginner alike will feel comfortable with the quality and quantity of the material.

Subjects covered include the general use of computers, hardware design and peripheral devices like printers, disc drives, etc, and Networking. Programming hints and tips and various disciplines for making a better program are discussed in some detail, including debugging of specific errors. Standard programs are covered, such as wordprocessors, spreadsheets, databases, graphics, communications, etc., which brings you neatly on to the subject of using computers in the office or at work – even giving advice on writing and marketing your own programs.

A book you will enjoy to use as a reference, or read from cover to cover, over and over.

Only: **£14.95** (No VAT)

The Complete Mouse User Guide to BBC Micro

This manual has been written to reveal the secrets of the mouse. It explains all the principles required by the hardware and associated software, and also example listings for inclusion into custom programs. The manual first details the basic principles of the mouse and a simple program which uses these principles. This information should be adequate for most applications. However, it is possible to improve the performance of the mouse by expanding on the principles already used in the software. This is again fully explained and an example program given.

It is possible to gain a full understanding of the mouse from this manual. For those not interested in exactly how the mouse functions, complete example programs are also included. These may be typed directly into the micro, without the need for any understanding of the hardware or software involved, enabling the mouse to be used for custom applications.

Price £5.95 (No VAT)

Example programs on Disc £4.95

Beeb PC (BASIC)

Beeb PC Basic is designed for program authors wishing to convert programs so that they will run on IBM personal computers. To convert BBC BASIC programs manually can waste days of valuable time with every occurrence of common statements such as PROC, DEFPROC, TAB, having to be changed.

Beeb PC (BASIC) automates many of these changes, and will convert majority of BBC statements that are invalid for IBM BASIC into equivalent acceptable statements. In addition BBC BASIC data files can be converted to IBM BASIC format, with support provided for all BBC data formats:- INTEGER, REAL & STRING.

Price: £38

Beeb DOS 3.0
(Now reads Archimedes Discs)

The BBC and IBM PC's are the most popular micros in the UK. The BBC is firmly established in the education sector and the IBM is the industry standard in the business world. The pools of information and applications held on these computers are immense, yet the means of passing information between them are very limited. Beeb DOS provides a practical method of transferring information between these two micros.

Beeb DOS is a collection of utilities which run on the PC's and enable it to read and write information on BBC discs. You can transfer files between your PC's 360K floppy, high density floppy or hard disc and your BBC discs. In addition Beeb DOS allows you to catalogue, format and compact BBC discs and delete, re-name, lock and unlock BBC files, all on PC's. Each Beeb DOS utility is written in IBM assembler and is run directly from PC or MS-DOS. The Beeb DOS utility can be run from floppy disc, hard disc or RAM drive.

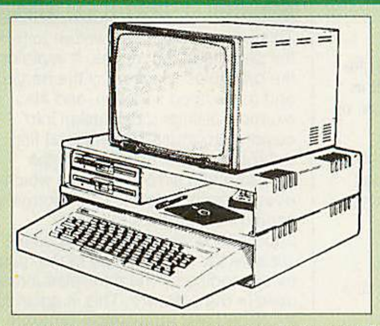
Beeb DOS is supplied on an IBM 5.25", 360K disc complete with a comprehensive operating manual. (Will only work on 360K Disk Drives & read only ADFS and Watford DDFS – not DFS).

Price: £39

(Please write in for technical literature)

Continued→ → → → → →

Plinths for the BBC B & Master 128K Micros

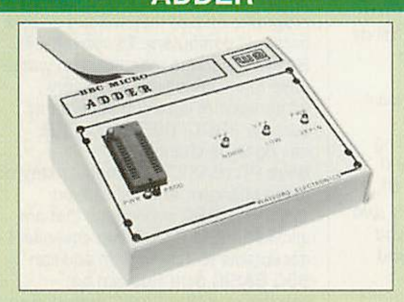


Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationery. The computer slides neatly in the lower section allowing easy access to remove the lid. Colour: Matching BBC Beige.

Single BBC Plinth	420 x 310 x 105mm	**£13**
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(Carr. Single plinth £2; double plinth £3)

ADDER



The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.

Features:

- Two ultra fast programming algorithms or standard slow algorithm.
- Supports standard 21V programming and newer 12.5 volt EPROMs. (Software switched).
- The RAM image to be programmed can be built up in many ways. Sections of image can be loaded separately. Part programming. Read EPROM. Edit data in memory.
- Automatic processing to handle a list of files to program into the EPROM.
- Automatic disc buffering to allow programming of 32K 27256 devices from a 32K file without extra effort.
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- Programs the following EPROMs: 2516, 2716, 2532, 2732, 2764, 27128, & 27256.

£65 (£5 Carr)

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EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast.

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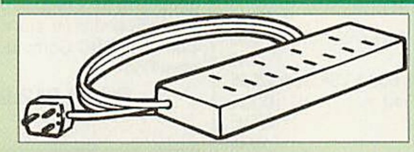
Replacement Flexible 17 way Keyboard Connector £4

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Fitted in place of your normal mains plug, this device protects your equipment (and data from corruption), against mains high voltage translent spikes/surges caused by lightening or thermostats switching.

Protection for only **£8.50**

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4 way top quality mains trailing sockets. Supplied wired up with mains plug ready for use. Can be screwed to floor or wall if required. Very useful for tidying up all the mains leads from your peripherals. **£9.50**

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A 4 way mains distribution unit as above with a built-in Surge Arrester, providing protection for your complete Computer/Hi-Fi System **£16**

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This extremely useful tool allows you trouble free chip insertion and removal from your computer by distributing the removal force over the whole body of any 24 or 28 pin chip. **£2**

Metal Chip Extractor **£3**

28pin DIL Header Plug

SOLDER type **£1.50** IDC CRIMP type **£1.95**

8 Way DIP Switch

Increase the speed of your Disc Drives by soldering this switch to your BBC B or B+ keyboard

Only **£1.00**

28 pin ZIF SOCKET (Textool) **£6.95**

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(All ready made and tested)

CASSETTE LEADS 7 pin DIN Plug

to 3 pin DIN Plug + 1 Jack Plug	£2.50
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Supply from BBC power supply to standard Disc Drive Connection: Single **£3.00**; Dual **£3.75**

Disc Drive Interface Leads

BBC to Disc Drives Ribbon Cable Single **£4** Twin **£6**

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Watford DATA DUCK

Convert two single Disc Drives into one Dual Drive with this simple external unit (Suitable for Disc Drives with PSU. For Disc Drives without PSU, you will also require Watford Power Duck, see below). **£14**

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27128A-250nS (12V5)	£2.50
27128-250nS (21V)	£4.00
27256-2	£3.00
27512-2	£4.50
27C101G (1 Meg)	£7.00
4013	75p
4020	£1.00
4164-10	£1.55
4464-10	£3.50
4816 RAM	£2.00
41256-8	£2.00
41256-10	£1.50
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6512A	£10.00
6522	£4.00
6522A	£5.00
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68B50	£2.95
68B54	£7.50
7438	50p
74LS00	50p
74LS04	50p
74LS10	50p
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74LS163	£1.00
74LS244	£1.00
74LS245	£1.00
74ALS245	£2.75
74LS373	£1.00
74LS393	£1.00
75453	£1.00
75159	£3.00
9637	£2.00
ICL7673PA	£3.00

Assorted ROMS

ACORN ADFS	£25
ACORN BASIC 2 plus User Guide	£22
Acorn BCPL	£42
ACORN DNFS	£17
Acorn FORTH	£32
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Master ULA (47)	£15
Master ULA (60)	£10
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Microtext Disc	£46
Microtext Rom	£199
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Numerator – BBC	£39
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Rom Manager	£20
ROMIT	£29
SERIAL ULA	£13
TED	£35
Termulator B, B+	£28
Termulator Master	£32
Video ULA	£14
ULTRACALC II	£26
1Mb OS ROM	£39



Hi-Speed, Low Cost Archi Hard Disc Drive

Watford's NEW Innovative IDE interface card brings the latest advances in PC hard disc technology to within reach of the Archimedes user. Because of the integration of the controller and drive electronics onto one compact board, Watford Electronics have been able to include extra features into the drive, such as Caching, where tracks are buffered in fast memory, reducing access times and increasing throughput. All these benefits make IDE drives far more attractive than conventional ST506 drives or SCSI.

Watford's advanced interface allows IDE drives to work on any Archimedes machine, speeds in excess of SCSI devices can be obtained at a fraction of the cost of a SCSI drive.

Up to four drives are supported by the IDE filing system IDEFS, up to two drives can be attached to each expansion card, up to four cards can be installed in a machine. An optional 20Mb or 40Mb hard disc can be supplied on the podule expansion card itself, with its fast transfer rate and power saving modes the drive is ideal for storing commonly used software such as the !Fonts application.

A powerful security feature has been provided with the two unique commands *IDELock and *IDEUnlock, ideal for educational establishments where hacking or tempering may be prevalent that may lead to loss of data. Once locked, the configuration can not be changed until a secret password is used. The !IDEForm Write Protect option is particularly useful in conjunction with *IDELock as it will prevent any unauthorised deletion of data.

By an innovative use of on-board memory, the card will remember its configuration, even if moved to another slot or even a different machine, this also includes the unique security features.

Hardware

- Single width EuroCard
- Supports proposed ANSI ATA (IDE) specification
- Fast 16 bit MEMC interface interrupt driven to support background disc operations
- 5 Mbytes per second peak transfer rate
- Built in Non Volatile RAM to hold configuration
- LED activity indicator
- 37 way D type socket for external drives
- Optional on-card 20Mb or 40Mb hard disc
- Up to two drives (master and slave) per card
- Multiple cards per machine (up to four)

Software

- Conforms fully to the Acorn IDE Specification
- All software supplied in ROM
- Filing system 'IDEFS'
- Desktop filer with drive ready detection and disc name under icon
- !IDEForm, WIMP based configuration and formatting software
- Drives can be individually write protected
- Up to four drives over multiple cards
- Power saving standby modes supported with configurable timeout
- Drives can be used without translation in native mode for minimum overhead
- !IDEFSDisk, creates PC emulator hard discs

*Commands

*IDELock
*IDEUnlock
! DEFS
Selects the IDE filing system 'IDEFS'.
*IDEDrives
Displays the configuration and native characteristics of installed drives.
*Configure IDEFSDirCache
*Configure IDEFSBuffers
*Configure IDEFSDrive

Typical transfer speeds

Prairie Tek	20Mb	650K bytes per second
Seagate	43Mb	800K bytes per second

Prices

Part No.	Capacity	Access Speed	Price
ADA 0520	44Mb	28mS	£249
ADA 0530	100Mb	16mS	£395
ADA 0570	200Mb	15mS	£535
ADA 0580	330Mb	15mS	£POA

All the above 3.5" hard drives are supplied complete with Controller Card, cable & Software on ROM. (Internal fitting). For use with A300/A400/A500 series machines.

For A3000 users an additional external Case and PSU will be required.

AAA 0300	External Case & PSU for A3000	£85

Internal Hard Disc Drives for A3000

ADA 0700	21Mb	23mS	★£275
ADA 0720	44Mb	28mS	£TBA
ADA 0730	89Mb	18mS	£TBA

Available Soon

Supplied complete with Podule, Fan, Cable & Fitting instructions.

★ Tentative Launch Price

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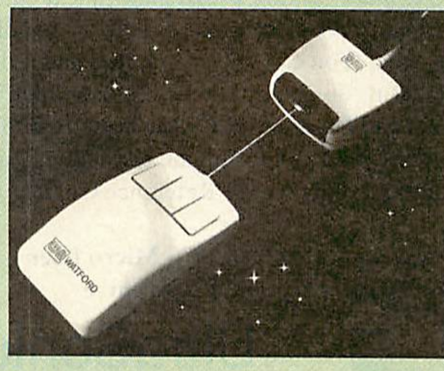
Watford's NEW low cost, high performance revolutionary IDE Hard Cards for the A300 and A400 series Archimedes are unbelievably easy to install – you simply slot one into any vacant podule backplane slot in the rear of your computer. These stunningly engineered, light weight but fast, 2.5" miniature hard drives are mounted onto the professionally designed cards, and are supplied with the fully Acorn-conformant IDE Filing System ready installed and ready to run. A novel feature of the hard cards is that they can be easily removed and transported to another Archimedes, for example to make a hard disc backup, or to transfer saved files from work to home etc. Security of files on the hard disc is ensured by our unique security password lock, which allows files to be read only, but not overwritten or deleted – ideal for use in school applications where the integrity of your master software needs to be retained.

ADA 0650	21Mb	23mS	£345
ADA 0660	44Mb	28mS	£495
ADA 0670	89Mb	18mS	£TBA

(Can be used as a Removable Hard Drive)

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Archimedes Cordless Mouse



Ever found that using a mouse on a busy desktop has its problems? The cable is always being caught up in papers, tangled round equipment and other cables etc, and what about that cup of coffee spilled over your work!

Watford Electronics' new Cordless Mouse solves these problems by removing the cause for concern - replacing the cable with a simple infra red link. It still provides all the speed and easy control of a conventional mouse, but with complete freedom. In use, there are no operating differences between the standard mouse and the new cordless mouse so all mouse functions and mouse driven RISC software will be fully compatible. Pinpoint accuracy is ensured by a unique Accelerator button, which, when pressed, moves the pointer by just a tiny amount for a large slow movement of the mouse, but by a large amount for a quick wizz of the mouse.

Features

- Infra Red Signal Transmission
- High Resolution 200 DPI
- High Tracking Speed of 600mm/s up
- Anti-static Silicon Rubber Coated Ball
- Low Friction Teflon Footpads
- Power - by two AAA size batteries (not included)
- Automatic Standby Mode after 5 seconds inactive
- Auto Power Shut-Down after 20 seconds inactive

Price £59

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ALPS



ALPS is **the** adventure creation system for the Archimedes. ALPS is multi-tasking with a built-in text editor and a sophisticated sentence analyser that can handle complex player commands. You can import graphics and redesign the character set. With its unique mouse-driven user interface and ramsave and ramload features, ***ALPS*** has been used to produce several commercial and public domain adventures. Includes 40 page Introductory and 66 page Reference Guides.

"Painstakingly put together" - **Micro User**
"Powerful and easy to use" - **Archive**

£34.95

Creator



Creator is a complete easy-to-use arcade game designer that runs in the Desktop on the Archimedes and A3000 to bring professional games techniques to everyone. On two discs, including the designer, run-time system, sampled sounds, tunes, sprite library and demonstration games and comes with a 50 page User Guide. Many, many features: • Animated sprites • Screen designer • Flight paths • Attack waves • Parallax scrolling • Sound effects • Music • Scrolling stars • No royalties

"Impressive ease of use" - **BBC Acorn User**
"An excellent piece of software" - **Micro User**

£38.95



UltraSonic



UltraSonic is the **only** fully RISC OS compliant, multi-tasking sound effect and music system. Simple point-and-click or MIDI note entry. Music may be used in ***Creator*** games and demos or simply for your own enjoyment. Includes Music Editor, Tracker Converter, Sample Converter, PD playback module, seven demo tunes and over 150 sound samples on two discs.

"A convenient way to create tunes" ***Micro User*** £30.00

Creator Support Disc

A disc with several useful applications for use with ***Creator***. Compact your sprite files and title screen, make outline fonts into ***Creator*** 'alphabet' files, convert sprites directly into ***Creator*** objects, run your games in Mode 9 for speed and memory savings, build a background from individual 'building block' scenery sprites. £19.95

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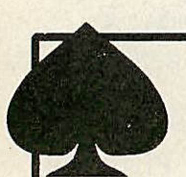
Also available: ***ALPS Support Disc*** - provides text and graphics compression for ***ALPS***: crams more text into memory and allows more pictures on disc. **£19.95.**




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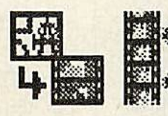




RISC OS Euclid is the best multi-tasking 3D graphics and animation system for the Archimedes. It is effectively a 3D version of Draw.

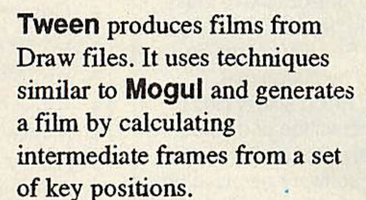
Mogul makes full use of **Euclid**'s unique hierarchical data structure to generate animations of 3D objects with articulated motion and simultaneous camera motion.

ArcLight is a multi-tasking ray-tracer which will generate a realistic Euclid picture, or a complete Mogul film, while you are free to get on with other work.



Tween produces films from Draw files. It uses techniques similar to **Mogul** and generates a film by calculating intermediate frames from a set of key positions.

Splice allows you to edit films produced by **Mogul** or **Tween**. You can even produce hand-drawn cartoons by converting sprites from any source.



Such is the enthusiasm for **Euclid** there is a user group called **Elements** , now in its second year, which provides a quarterly disk containing hints, tips, animations and user pictures.

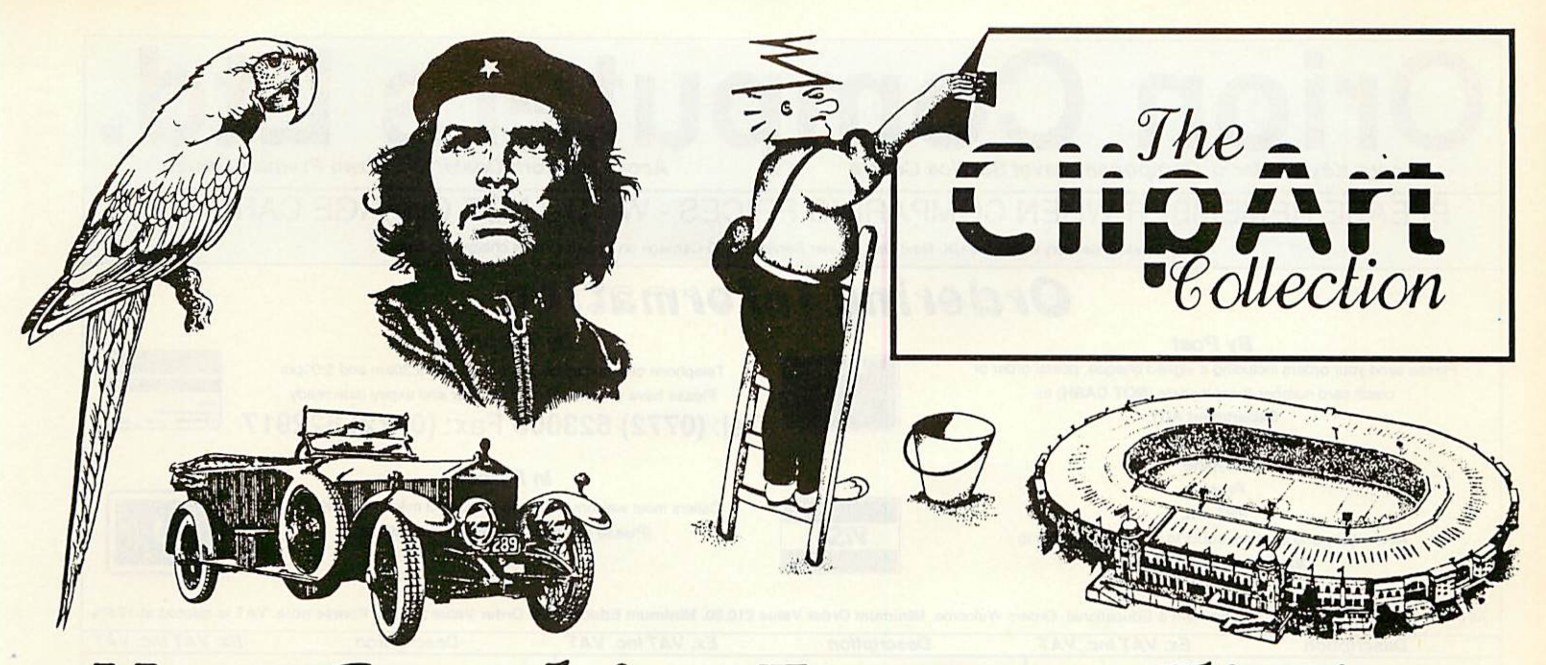
ArcLight £50
Euclid £70
Mogul £20
Splice £30
Tween £30
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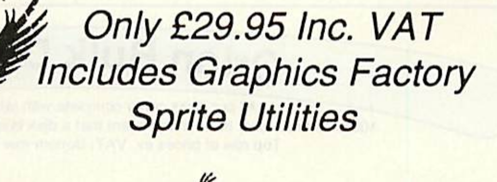
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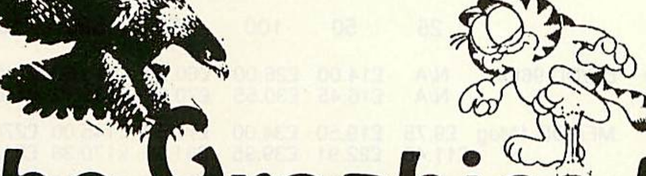


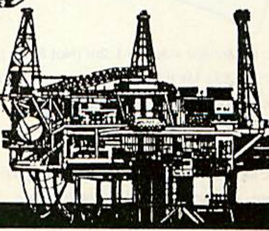
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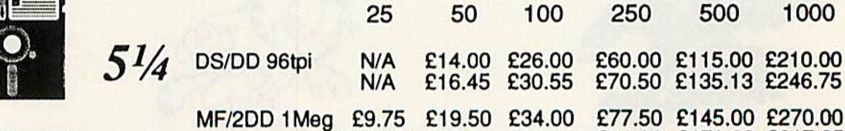
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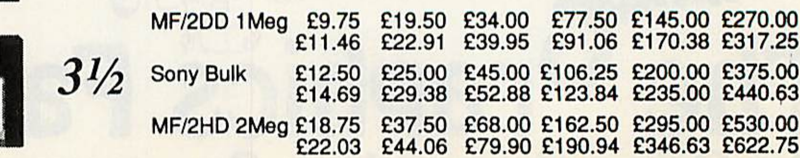
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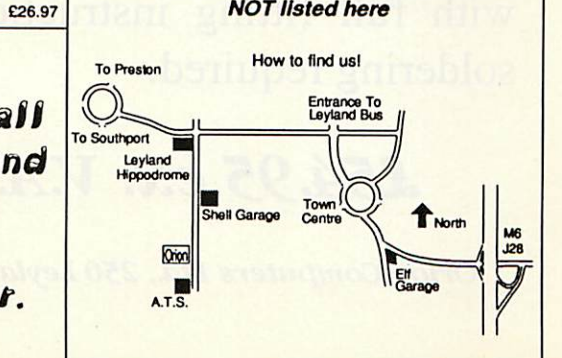
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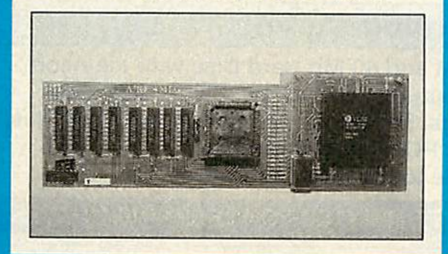
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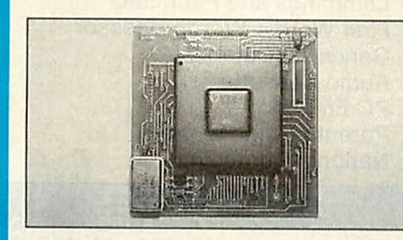
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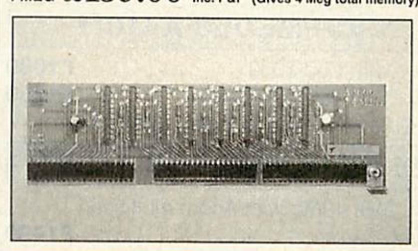
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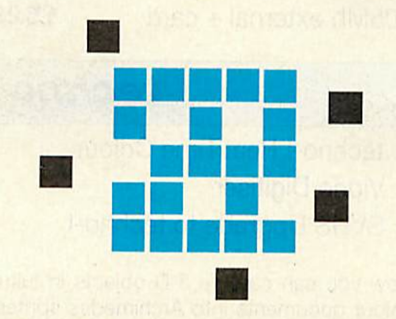
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His program, *ThinText*, works by reading a character's definition (using faithful old OSWORD 10) and carefully shifting the bits out, picking every other one. Because characters are having their widths halved, they are dealt with in pairs – each pair of standard characters being shrunk to form a single new one, which is then plotted. This method keeps the code short and quick.

Because Martyn's program reads and redefines characters legally, it will work on all eight-bit machines with shadow Ram and second processors and will also function correctly with all the 6502 emulators on the Arc.

It is also mode independent – as you will see by the short demo routine included. Although the characters are only four pixels wide, they are surprisingly readable. Even in mode zero (where you get a staggering 160 columns of text) the individual letters are clearly distinguishable.

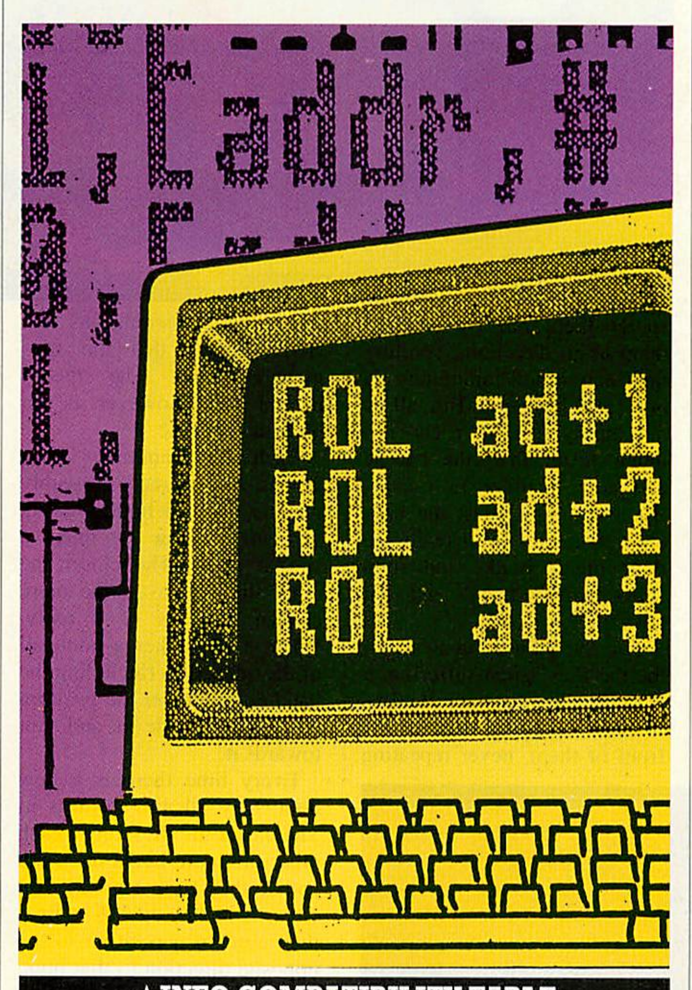
In keeping with the idea of getting more characters per screen row, we were prompted by Martyn's submission to dig out another example. *PropText* displays character proportionally spaced on the screen. Unlike Martyn's program which guarantees to double the number of characters per line, *PropText* cannot do the same, although typically you'll get about 25 to 35 percent more with no reduction in letter quality. In fact, the display is 'prettier' since thin characters like 'i' do not have large areas of space on either side.

Like *ThinText*, *PropText* uses OSWORD 10 to read characters' definitions. The routine .buildtable uses the call to build up three tables. These contain the width of the character and the size of the blank borders on the left and right hand sides.

The routine .length returns the length of the string stored at word%. The length is in pixels (including spaces between letters and words) and can be used to centre text, as in the example. Before the text is plotted, you must issue a VDU 5 command to ensure that characters are plotted at the graphics cursor.

Plotting by this method is slower than in Martyn's program but this is the only easy way of getting the desired effect legally (which means without resorting to poking the screen directly).

The routine .prop actually puts the text on the screen. The graphics cursor is moved to the left to take account of the left border of a character, then the character is plotted and finally the cursor is moved left again, if necessary, in order to close up any gaps on the character's right.



★INFO COMPATIBILITY TABLE

LISTING	NAME	BBC B	MASTER	ELECTRON	ARC
Info 1	ThinText	★	★	★	
Info 2	PropText	★	★	★	
Info 3	Blindflies				★
Info 4	Plasma				★
Info 5	MindMaster	★	★	★	★
Info 6	ArmTree				★
Info 7	Snowflake	★	★	★	★
Info 8	DTSrc				★



It should be easy enough to adapt the routine for use in your own programs, although as it stands the code works only in mode one or mode four (40 column modes). To use it in mode zero, you will need to remove the *2 at line 230, remove the ASL A at line 770 and change the LDA #4 at line 790 to LDA #2.

To adapt the program for mode two or mode five change the *2 at 230 to *4, add another ASL A at line 775 and change the LDA #4 at 790 to LDA #8. Of course, you will also need to change the MODE 4 at the start as required.

★PRIZE £50★

HIGH FLIER

Our winning program this month is the amusing fly simulator from **Barry Wickett**. The flies are blind but they have excellent stereophonic hearing, and it's by using this, that they manage to find each other. When they feel lonely they make little honking noises, which the others follow to find their lonely friend. If the noise is close they are likely to acknowledge in a similar fashion. Eventually all the flies find each other and form a group, happily dancing around each other, making little noises to make sure that the others are still there.

Just when all seems fine and dandy and they think that they can live happily ever after, like in all good fairy tales, a baddie (boo, hiss) comes along and spoils their fun by shooing them in all directions, spoiling their new-found community. (a big 'ahhhh' here). But all is not totally lost, they can run much faster than the baddie and soon manage to escape. But eventually, alas, the baddie catches up by listening to their merry honks and soon splits them up again – and so it goes on.

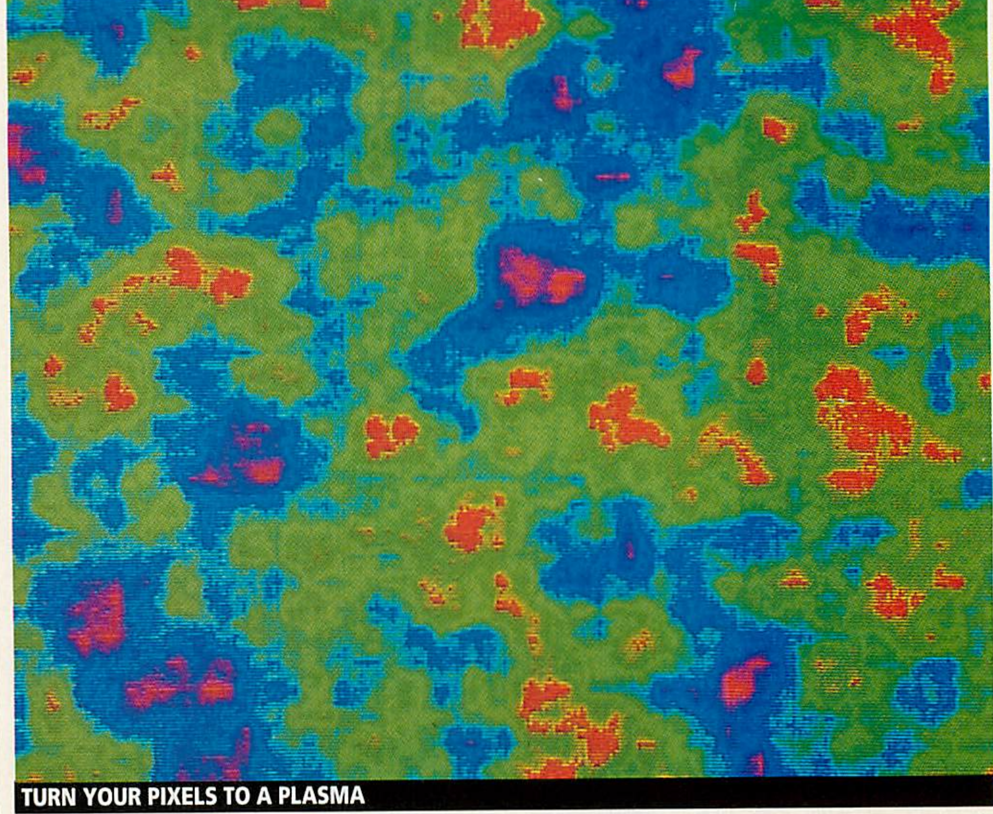
For the viewer, unaware of the the flies' great suffering, it is rather nice watching the live 'ballet' being performed in front of them, never repeating itself, and listening to the stereo chorus that the flies merrily make. The theory behind it all, however, is not quite as romantic.

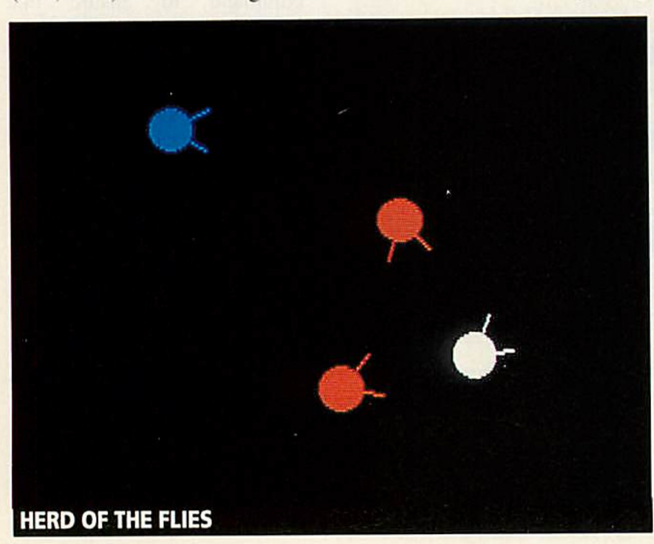
Each fly randomly flies around the screen, possibly making the odd hoot, waiting to hear a fellow fly make a similar noise. The closer the other flies are to it, the more chance there is of a reply. When a fly makes a hoot, all of the other flies (including the baddie) remember the position that it was made at and aim towards it.

Every time there is a new hoot, they all aim towards it. The closer the flies get to each other the more hoots there are and so they form a group. But when a baddie makes a hoot they aim for a position in the opposite direction to that hoot. Thus they are scattered. It's all quite simple really.

The usual screen swapping technique is used to aid smooth flight and the effect of the flies' hoots is greatly enhanced if you switch the internal speaker off and use either stereo headphones or speakers, as the position of the fly in the x direction when it makes a noise is reflected in the stereo position of the sound channel.

This program follows on from where **Jonathan Lynch's** *Flocking* (Risc Revue, December 90) and **Bryan Creer's** *Herding* (Risc Revue, June 91) left off. Unfortunately, due to the large amount of calculations that need to be performed, the program will only run on 32-bit machines; we would very much like to see a fast eight-bit version.


TURN YOUR PIXELS TO A PLASMA


HERD OF THE FLIES

★PRIZE £25★

PLASMA CLOUDS

Phil Le Sueur of Stockport provides this Arc version of a PC public domain demo. As he says, the effect of swirling clouds of plasma is difficult to describe, so it's best to just run the program and watch the result. The basic idea is simple. A pattern of clouds is built up on the screen. Areas of different colours are created in such a way that they merge smoothly into each other. When the whole pattern is complete the colours are cycled and the clouds appear to grow and

fade as part of an endless sequence.

When you first run *Plasma* you are asked for five parameters – just press RETURN for suitable defaults. The graininess determines how quickly the colours change from pixel to pixel across the display. A low value will result in large swirling areas; a high value quickly changing peaks and troughs. Next you can specify the displayed area. To plot the whole screen enter 1280 for the y size and 1024 for the X. Finally, enter the pixel size. A pixel of one by one is the smallest possible – try larger values for a chunkier effect.

As Phil points out, it would have been nice to alternate the colours by changing the palette. However, the Arc has limited facilities for doing this and although the mode used supports 256 colours, these can only be altered in a very limited way.

Instead, a look-up table of colours is used. Every time a colour is altered, the next value from the table is found and poked on to the screen. Because this has to be done for each displayed pixel, some fast machine-code is required and indeed, Phil has made the code even faster by expanding the central part of the loop so that a whole line of pixels can be cycled, without the need for a branch instruction (which are quite slow to execute).

The plotting routine is a little piece of recursive Basic (★INFO readers do like their recursion, don't they). This repeatedly divides and subdivides the screen into rectangular shapes and fills them with a colour that is calculated using Phil's own algorithm. Although this is not the same as the PD version, the results are just as good.

Incidentally, any variations on this theme are most welcome. In particular, if you have the patience to write the initial screen plotting routine in zippy machine-code or speed up the cycling yet more (by using multiple load and store instructions perhaps) we'd like to see the result. All programs and ideas to the usual address please.

★PRIZE £20★

MINDMASTER

B B+ M C E A

Do you remember that game with the little brown board and the pegs that everyone got three copies of for Christmas about 15 years ago? Well, even though I played it more or less constantly for several months as a child, I still find the game fascinating enough to thoroughly enjoy this version from **J A McHugh**.

For the few of you Santa left out that year, the rules are quite simple. The computer picks a random sequence of colours from the list shown. You then try to guess the sequence by giving sequences of your own. Each guess will be given a rating. A blue block means you have guessed the colour and position of a 'peg' correctly. A white block means you have got the colour right but the position wrong. When you get a reply of four blue blocks you know that you have guessed the sequence correctly. If you haven't guessed after eight tries, you lose the game and the code is then revealed.

You have the choice at the start of allowing double colours. This means that the secret code may include two or more pegs of the same colour and this will make it more difficult to guess.

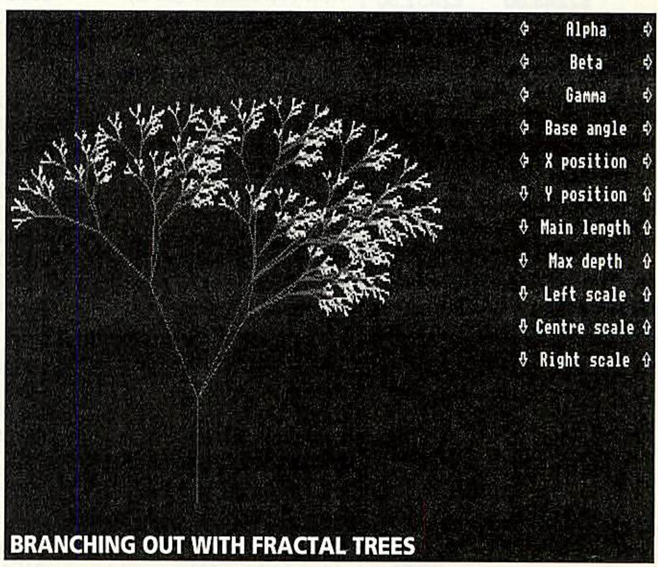
We'd be interested to see any good (and concise) computer-play routines to add to this game. If you can get your machine to reliably deduce your code, send your program in and we'll happily publish the best.

★PRIZE £20★

TREE PIECE

B B+ M C E A

Nature has featured extensively in ★INFO since the column's conception and presents constant challenges to humble programmers like ourselves to emulate its finer points. Recursion – the repetition and 'sub-repetition' of an idea – is commonly used when simulating natural phenomena



BRANCHING OUT WITH FRACTAL TREES

(trees, ferns, coral, even coastlines – all are recursive by nature) but recursion can often be quite slow. For this reason, it is often difficult to predict the finished product of a 'natural' recursive program.

Daniel Tray has come up with a speedier example though, and the beauty of his program is that you can alter the way nature 'works' and see the results almost instantly. His *ARMTree* listing plots a recursive tree. From a central trunk, three branches sprout and from each of those, three more. The process continues until a specified 'depth' is reached and the various layers of growth are coloured appropriately to give the appearance of a 'real' tree.

On the right of the screen is displayed a set of parameters – each with arrows. You can alter any of the values shown by clicking with the mouse on an arrow. The tree will then be redrawn and you can see the effect of the change. We think you'll find the demonstration particularly useful if you are still trying to get to grips with the whole idea of recursion.

The X and Y positions simply dictate where the tree sprouts on the screen. The base angle is the angle between the trunk and the ground. Three more angles can also be altered: alpha, beta and gamma. You'll recall that each branch splits into three smaller ones and each of these into three more. Each time a parent branch produces three offspring the angles at which they diverge from the parent are alpha, beta and gamma.

Altering the main length changes the overall scaling of the tree (that is, how much smaller each sub-branch is than its parent). You can also individually alter the scaling factors for each of the three possible directions branches may take – these are listed as left scale, centre scale and right scale on the screen. Finally, you are also able to increase or decrease the maximum depth of the recursion – how many times a branch will divide and subdivide.

The heart of Daniel's program is in machine code as it needs to plot the tree as quickly as possible. It is similar in structure to many programs we've carried in the past. The routine .tree plots a branch, then calls itself three times to plot the three sub-branches. With each call to itself, 'local' variables are preserved in a stack. This means that, having plotted a sub-branch, and any sub-branches from that, the program remembers where it was and can carry on and plot the rest of the tree correctly.

Daniel's listing is legal in that it uses the OS_Plot call to draw each part of the tree. If you were to incorporate your own line-plotting routine that poked the screen directly, it would be possible to draw the tree even faster. We'd be delighted to see (and possibly publish) any This is left as an



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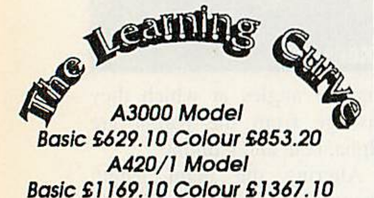
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SNOWFLAKE

B B* M C E A **John Knowles** has supplied us with *Snowflake* – a little graphic doodle that works on all machines. Simply enter the number of points and a 'divide by' value and watch the pattern build up. Values of two and two will provide the familiar Sierpinski Gasket. Values of six and 1.6 will create a rather nice snowflake (hence the title).

In fact, the program is an extension of the original Sierpinski theme. Given *n* points arranged in a circle about the centre of the screen, start at point one and repeatedly pick another point at random. Move towards this point (the distance you move is determined by the 'divide by' value) then pick another point and move towards that. Keep picking points in this way.

Although the whole journey is apparently random, the pattern created has a very well defined structure as can be seen in the snowflake.

MODULE TASKS

B B* M C E A If you take a look at the Task display window you'll see that it groups the currently active tasks into two sections; Application tasks and Module tasks. Application tasks are programs such as *Edit* or *Paint* that load into application memory starting at &8000. If you write a multitasking program in Basic or C, you'll be writing an application task.

Module tasks, on the other hand, run from within the RMA and must therefore be written in code. They tend to be desktop utilities rather than full blown applications, although this is by no means a concrete rule. The filers, palette and task manager itself are all module tasks.

There are two main advantages of module tasks over their application counterparts. Firstly, they only use the memory that they are loaded into (application tasks use 8K or 32K chunks at a time, depending on your machine size) and, secondly, as modules are not cleared when you quit the desktop, these tasks will re-initialise themselves when the desktop is started up again.

Writing a module task from first principles is quite a tricky business, the Programmer's Reference Manual describes itself as providing: '..the special requirements of module tasks, but not how to write modules from scratch.' As we're in the business of unravelling the depths of Risc OS, we've done all the hard work and come up with a fully working module task demonstration for you to examine.

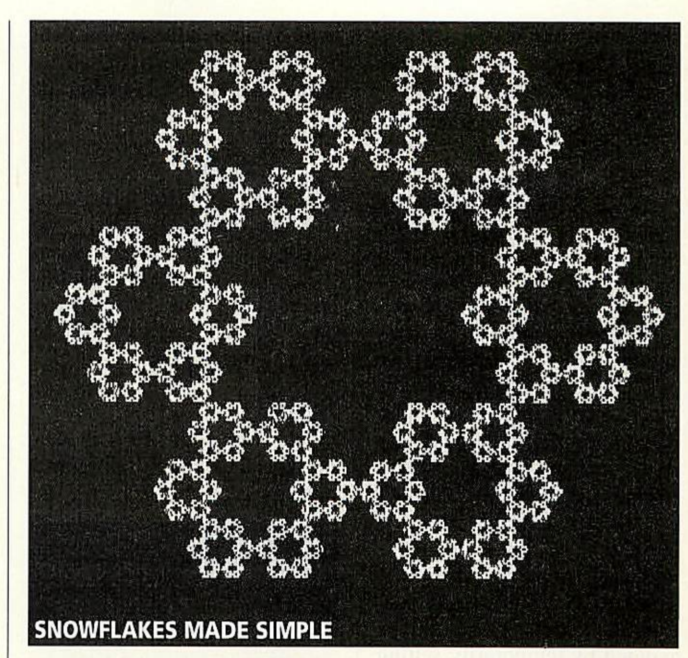
The *DoubleTake* module provides a couple of useful functions for moving round directories and examining files. Double clicking *and holding* a mouse button over an application will open a directory viewer for that application instead of running it (the same as double clicking whilst holding down the SHIFT key). A similar action over any file will load that file into *Edit* (if it is loaded). This is very handy for examining Command or Obey files.

So how does all of this work when you get down to the programming level? Well, the first part of the code (up to .ServiceCode) is a standard module header. Note that all entry points (except those to do with SWIs) are used.

When the module is first loaded, .InitCode is called. It claims 300 bytes of RMA (Relocatable Module Area) as workspace and marks the task as being inactive (taskhandle is set to zero).

Next comes the star command handler. The star command is provided for internal use only and is usually prefixed by Desktop_. We'll come to this later. All this command needs to do is issue an OS_Module 2 which causes the module to be entered as a language, through its start code entry point.

The start code has a similar structure to a normal task – that is an initialisation phase followed by a Wimp_Poll loop. Our example starts by checking the stored taskhandle. If this is non-zero, it means that the code is already running and the previous incarnation is then told to go away with Wimp_CloseDown. Wimp_Initialise is called to set up the task and taskhandle is updated with the returned value.


SNOWFLAKES MADE SIMPLE

Next comes the Wimp_Poll loop. *DoubleTake* is only interested in a couple of wimp messages, so the mask supplied in R0 ignores many of the possible return codes. Message 0 is quit, so the task calls Wimp_CloseDown to close down and zeros taskhandle to mark itself as inactive. OS_Exit is then called to quit finally. The other message that this loop waits for is number five – Message_DataOpen.

This is sent when the user double clicks on a file. The programs reads the clock and then goes into a little loop, reading the mouse and the clock. If the mouse button state ever returns to zero then the user has stopped holding the button and control returns to the Wimp_Poll loop. On the other hand, if the time read is more than 20 greater than the original time read, then further action must be taken.

First, the message is checked to see if it was in fact sent by *DoubleTake*. If so, nothing more is done otherwise the message is acknowledged. Table one shows what the rest of the message block contains. The file type is checked, if it's less than &1000 it's a file, &1000 is a directory, &2000 is an application. For both of these latter types, a directory viewer needs to be opened. Message Filer_OpenDir is used for this purpose, but first a little jiggery-pokery needs to be performed. If the user double clicks with the Adjust button, the parent directory viewer needs to be closed.

There doesn't seem to be any neat way of doing this, so the full pathname is searched and truncated before the final leaf name. A Filer_CloseDir message is then sent with this string. Finally, the full pathname is restored and the Filer_OpenDir message sent. This doesn't quite perform the same effect as when a directory is opened with Adjust, as the new directory viewer will appear in a different place from its parent.

If a file is double clicked, a little sneaky trick is used; the DataOpen block is altered so that the file type is &FFF (text) and the message re-broadcast. If *Edit* is loaded, it will therefore now think the file is a text file and load it in. Luckily, *Edit* checks the file type itself and the save box that it provides will contain the correct file type icon.

There are two last parts to the module. The first is the finalisation code. This simply



checks if the task is active and if so, closes it down. It also frees up its RMA workspace.

The last part of the module deals with service calls. There are a dozen or so calls that may be issued, but we are only interested in three of them. Service_StartWimp (&49) is issued by the *Desktop command to start up any resident modules.

Remember that the star command is for internal use only? Well, this is where it is used. You should return with R0 pointing to the module's star command and R1 set to zero to claim the call. (The call is issued repeatedly until no one claims it.)

A slight problem can arise if a module task does not successfully start. This can be avoided by temporarily setting taskhandle to -1. The code at the beginning of .StartWimp then only sets R0 and R1 if taskhandle is zero, therefore ignoring any dodgy modules.

So that these modules are given a second chance, two other calls are issued; Service_StartedWimp (&4A) is issued once all the resident modules have been started up and Service_Reset is issued in the event of a soft reset. In either of these cases taskhandle should be reset to zero.

If you'd like to write your own module task, then you could delete the lines between .repeat and .FinalCode and use this as a framework. As always we'd be very interested to see any of your efforts.

★QUIT

Well, that's it for another month. Too many programs and not enough space. We did not even have room for the usual collection of one-liners this time, so you'll have to wait until the February issue to see Adrian Dale, Gavin Sallery and Gareth Moore's mini-pieces. How can you possibly stand the suspense? (Hint 1: why not fill in the reader survey opposite. Hint 2: write an amazing program and send it into ★INFO).

Dave Lawrence
Dave Acton

CONTENTS OF DATAOPEN MESSAGE BLOCK

R1+20	window handle of directory display containing file
R1+24	unused
R1+28	x-offset of file icon
R1+32	y-offset of file icon
R1+36	0
R1+40	file type
R1+44	full pathname of file, zero-terminated

Please send your submissions to ★INFO at the address given opposite. All but the shortest of programs should be on disc and accompanied by a brief description of their purpose and operation.

A stamped addressed envelope enclosed with your submission will ensure the safe return of your disc.

READER SURVEY

We try to cater for everybody's needs in ★INFO and after seven months of the combined eight-bit/32-bit column, we would like to know if we are, in fact, offering you the right sort of things.

We would also like to take this opportunity to find out from readers what equipment and software they use. With this information we will be able to cover more fully those areas which readers are interested in and therefore, we hope, provide a better service to everyone.

Please send your survey entries including any special suggestions to:

★INFO Survey
BBC Acorn User
20-26 Brunswick Place
London, N1 6DJ

All survey responses should reach us no later than Friday 24 January 1992.

Please turn to page 55 and fill in our reader survey form (photocopies of the page are perfectly acceptable). As an incentive, the first 10 entries picked out of the hat will receive a free subscription to both the magazine and monthly disc.

1. What computer(s) do you own or use?

0 ❑ Electron
1 ❑ BBC Model B
2 ❑ Master 128
3 ❑ Compact
4 ❑ Archimedes/A3000
5 ❑ Other

2. What peripherals do you own or use?

0 ❑ Hard disc
1 ❑ Dot-matrix printer
2 ❑ Laser printer
3 ❑ Multisync monitor
4 ❑ Modem
5 ❑ MIDI equipment
6 ❑ Hybrid music equipment
7 ❑ Other – please specify (include any Archimedes podules)
....

3. Do you own any of the following:

0 ❑ Eight-bit Sideways RAM — How much? ....
1 ❑ Shadow RAM
2 ❑ Second processor — Which one? ....
3 ❑ Archimedes expansion RAM — How much? ....
4 ❑ ARM 3

4. Do you use any of these pieces of software?

0 ❑ *View* family
1 ❑ *Wordwise*
2 ❑ *Inter* family
3 ❑ *Pipedream*
4 ❑ *Impression*
5 ❑ *Acornsoft C*

5. Please answer yes or no for the following:

	yes	no	
0	❑	❑	Does *Info cater adequately for your machine?
1	❑	❑	Do you type in ★INFO listings?
2	❑	❑	Do you modify the programs for your own use?
3	❑	❑	Do you prefer ★INFO to Risc Revue and Eight Bits?
4	❑	❑	We try to provide versions of all ★INFO programs for all
5	❑	❑	Are you a competent Basic programmer?
6	❑	❑	Are you a competent machine code programmer?
Archimedes users only:			
7	❑	❑	Do you have access to a set of programmer's manuals?
8	❑	❑	Do you prefer the desktop to the command line'?

6. Would you like to see more or less of the following:

	less	same	more	
0	❑	❑	❑	Eight-bit features
1	❑	❑	❑	32-bit features
2	❑	❑	❑	Programming techniques (such as sorting)
3	❑	❑	❑	Hints & tips
4	❑	❑	❑	Utilities
5	❑	❑	❑	Graphical doodles
6	❑	❑	❑	Games
7	❑	❑	❑	Sillies and one-liners
8	❑	❑	❑	Programming queries
9	❑	❑	❑	★INFO in general

7. What suggestions do you have for topics to cover or ways to improve ★INFO?

....

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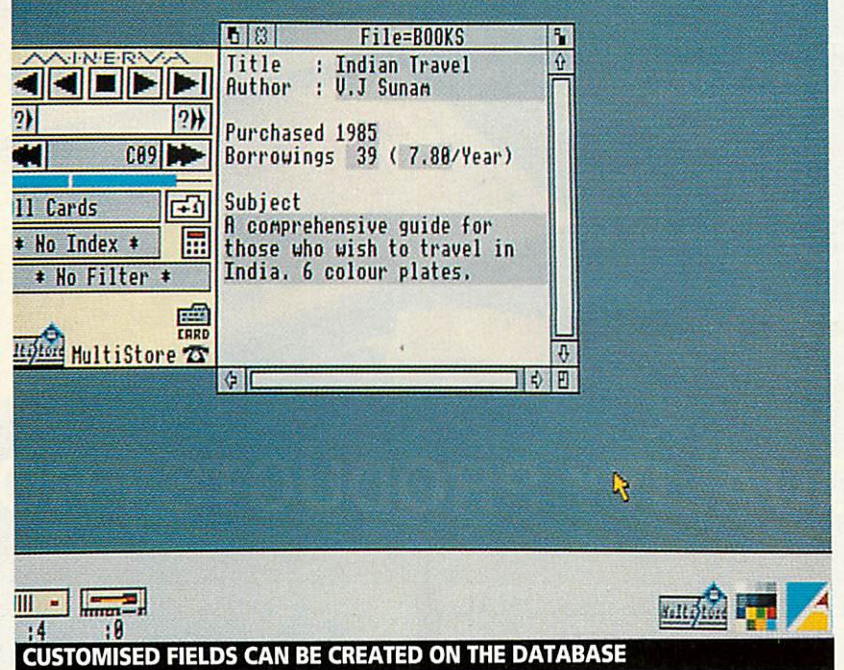
DATA BASICS

The information age has arrived, but some people are still missing out. DAVE FUTCHER puts the records straight

All businesses, no matter how small, need to keep and maintain records and, in recent years, computers have provided a solution to record management.

The Archimedes in particular, with its large capacity for memory and processing power, has proved ideal at handling the vast amounts of information which can then be sifted through at high speed.

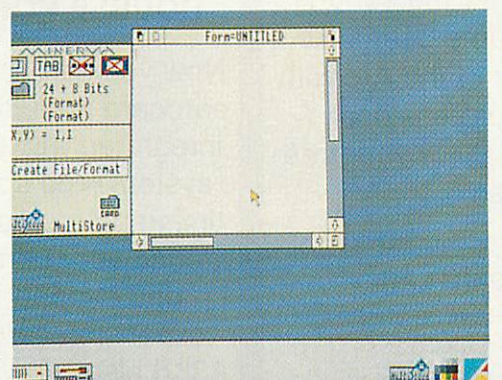
Powerful and versatile database management programs have evolved, fulfilling two main purposes: firstly, data can be entered and retrieved, as well as updated; secondly the software enables the filed data to be manipulated by searching and sorting, to output reports, summarise information, print invoices, or calculate.



CUSTOMISED FIELDS CAN BE CREATED ON THE DATABASE

At its simplest level, a database is like a card index. In a company, to keep account of every employee, each person would have a dossier recording his or her name, address, date of birth, position, income, and so on. In a database an individual's card is called a record; each record contains fields in which the details (name, address, date of birth...) are recorded. A collection of records is called a file.

A database management package should provide facilities to add and edit records, sort by specified fields and extract records that match a specified criteria.



EACH FORM CAN BE TITLED SEPARATELY

SETTING UP

Before creating a database file with any database management program, think carefully about the type of information to be stored and the design of the card that will hold it. It is a good idea to do this on paper initially, deciding on the length of each field and the order of data entry.

How the database is set up will depend on the individual program being used. As an example, I have chosen Minerva Software's *MultiStore* program. From the main *MultiStore* menu the Create option is selected, bringing up a window where you can design the card layout, entering the fields to be filled. If you are setting up, say, a company information file, the fields would probably be the company name and address, the telephone and fax number, a contact name and so on. Each field needs a label so that the user knows what information to enter and where. To create one for the first field, place the caret in the window and type NAME followed by two spaces and a colon, then RETURN. Each field can be of a pre-defined length, established by typing in a number of @ or + symbols. So, for the name field, you might type in 20 of either of these symbols. Names rarely exceed 20 characters – so allowing space for any more would be a waste of useful memory.

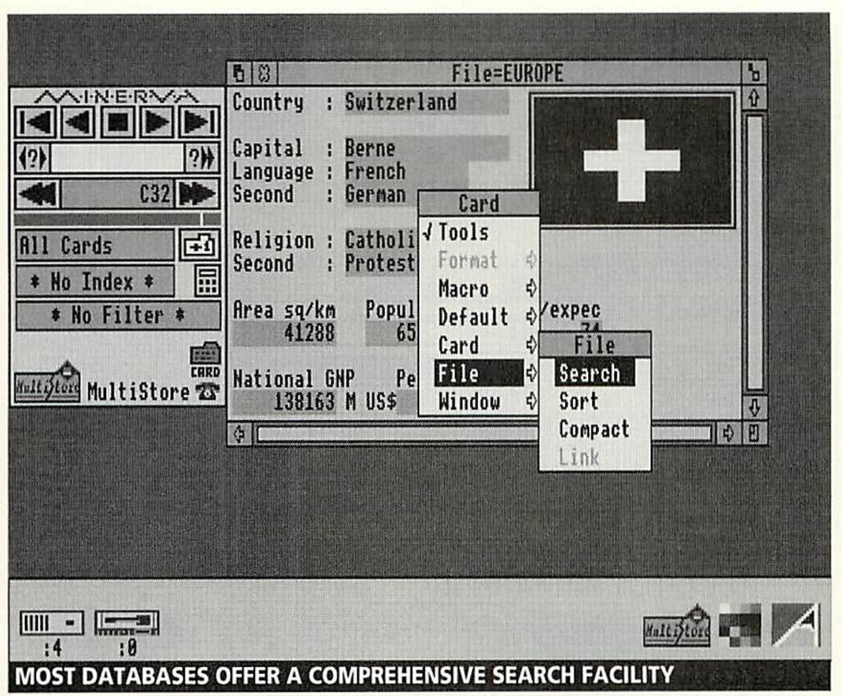
The characteristics of the field can be defined by placing the pointer over this row of symbols and clicking the mouse to bring up the Field information dialogue box. Fields can be added in the same way until the record layout is complete.

You can then click on Create file/format in the Tool box to create the file where the layout will be situated. As part of this, the size of the file has to be defined in number of cards or kilobytes. To enter data into a file, drag it from the directory on to the *MultiStore* icon. After it has loaded, the Open file window will appear. Click on OK – after a short while the Browse and File windows will appear. To add a new card to the file, click on the Add card icon.

Standard edit facilities are used to enter data in each field. Press RETURN at the end of a field to move the cursor on to the next field. Default type fields, set when creating the card, are skipped over. To prevent typing in the same information repeatedly, save it in the notepad and just copy it over. To complete an entry click on the Stop icon or press RETURN in the last field. Pressing CTRL-A after entering the data in the last field saves the record and opens up

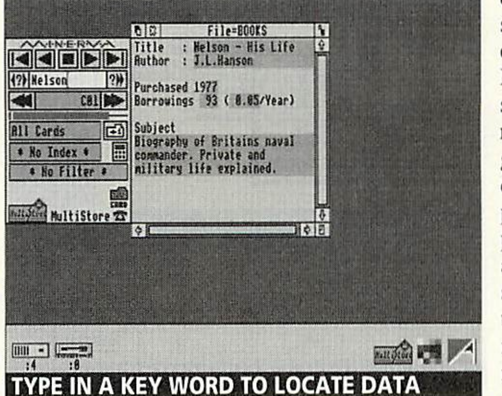
another blank one, so you don't have to click the Add card icon every time. It is easy to look through files created in *MultiStore*. To the left of the Browse window is the Tool box containing icons which look and behave like the controls on a video player. There are icons for the start and end of file, and others for moving forwards and backwards one card at a time.

While you browse through the cards, a white marker on the file gage indicates the position of any selected record in relation to the rest of the file. The number of the record in the file also appears just above the gauge. To move continuously through the cards use the fast forward and reverse icons.



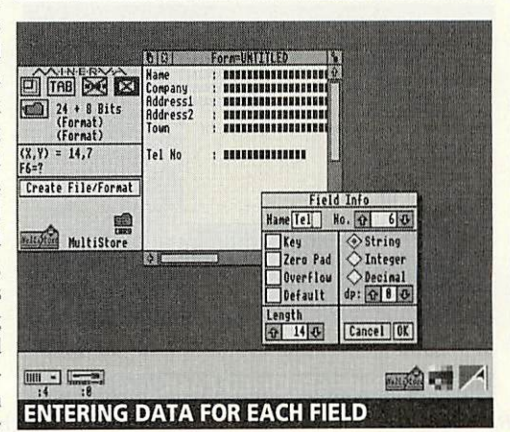
MOST DATABASES OFFER A COMPREHENSIVE SEARCH FACILITY

MultiStore provides several ways to find one or more particular cards. The easiest way is the Fast find option in the Tool box. If you are looking at a file containing details about a set of library books and wish to locate all the books regarding Nelson, click the Fast find box and type in NELSON, then click on the Find card icon. Once the first book has been located, click on the Find next icon to find the next card referring to Nelson.



TYPE IN A KEY WORD TO LOCATE DATA

More complex searches can be made which will allow the result of the search to be saved as a subset of the main file. Say, for example, you are looking at the file about the countries in Europe and wish to find the ones whose religion is Catholic. You would first double-click the Clear icon to remove the existing expression and then drag the Religion field from the card and drop it into the search expression box, where @Rell will appear. The Contains icon is then clicked on and, at the ready positioned cursor, CATHOLIC is typed. If the OK icon is clicked the search begins and a Searching cards window will appear. When finished the last card will appears in the card window. Subset B appears in the Subset icon and, if you browse through this file, only countries that are Catholic will be displayed.



ENTERING DATA FOR EACH FIELD

POPULAR PACKAGES

There are a number of packages available, at widely varying prices, which allow you to manage your information effectively.

AlphaBase has its roots in the popular *Beta Base* eight-bit database package for the BBC micro, although it has improved in appearance, ease of use and facilities. It also uses Clares' own colourful icon system, developed for *Artisan*. It costs £43.80 for the Archimedes, and is available from Clares, 98 Middlewich Road, Rudheath, Northwich, Cheshire CW9 7DA. Tel: (0606) 48511.

Base 5 DBMS is a programmable database for software developers. At its heart is a powerful set of Basic procedures and functions to allow programmers to design databases to specifications. It is not a database manager with a programmable language tacked on, but a multi-tasking front end called *WimpBase 5* allows the package to be used as a database if you want to write your own applications. It costs £69 from Base 5, PO Box 378, Woking, Surrey GU21 4DF.

Desktop Office is a fully integrated package covering wordprocessing, databases, spreadsheets, charts and comms, each existing as separate Risc OS applications. Modelled on a card index, it uses video style icons to move easily through the records. Datafiles can be searched and groups of related cards formed. Reports consisting of all the cards in the file or a previously searched group can be created, printed and exported to a disc or another application. For an all-purpose office system then *Desktop Office* provides the tools; but if you have a serious requirement to handle data you will probably need to upgrade to a more powerful package. It costs £85 from Minerva Software, Baring Crescent, Exeter, Devon EX1 1TL. Tel: (0392) 437756.

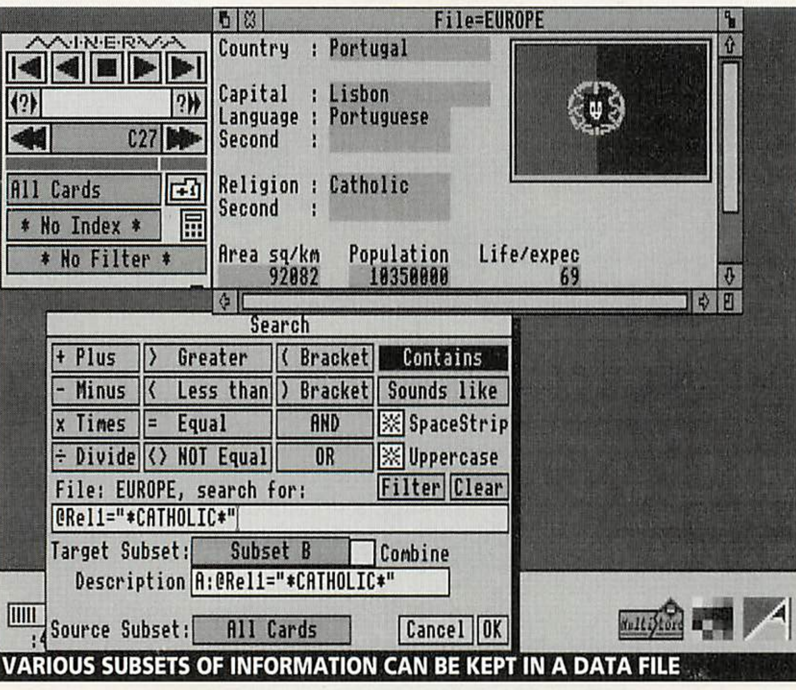
The previously mentioned *MultiStore* is a relational database which allows many files to be open at one time. It is possible to link more than one together and look at, for example, a datafile of books and a separate file of authors with the information displayed alongside. It has genuine internal multitasking and therefore you can perform a sort on one file and search another, while loading and browsing a third.

There are key fields for instant searches, indexes to allow file browsing in more than one order without searching, fast sorting by single field or complex expression and truly comprehensive reporting facilities. Its relational report writing and mail-merge facilities means it is ideal for the most demanding and complex applications. The capacity of the package in terms of separate records is enormous and the field size is beyond the limits of what most users will need. However, its ease of use makes it just as much at home creating the most complex business application, such as stock control. It costs £199.

Flexifile is similar to the more sophisticated *MultiStore* package, without the more complex

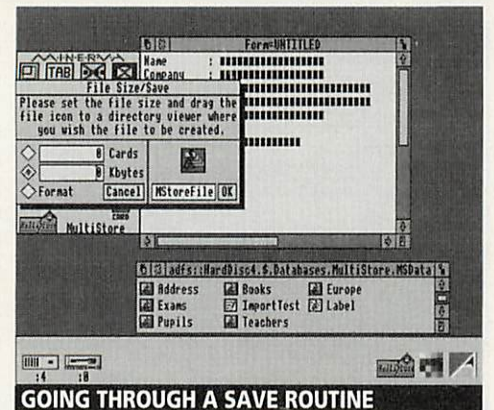
functions. However, it is still a relational database and multiple files can be open at the same time, although there can only be linking between two files. It costs £99 from Minerva.

Flying Start 2 is an import from the PC world where it proved popular. Although it does not run in a Wimp environment, it is nonetheless, a well thought out database system. Both the use of indexes for file access, and the facility to link files are a real asset. It is £86.91 from Mitre Software, International House, 26 Creechurch Lane, London EC3A 5BA. Tel: 071-283 4646.



VARIOUS SUBSETS OF INFORMATION CAN BE KEPT IN A DATA FILE

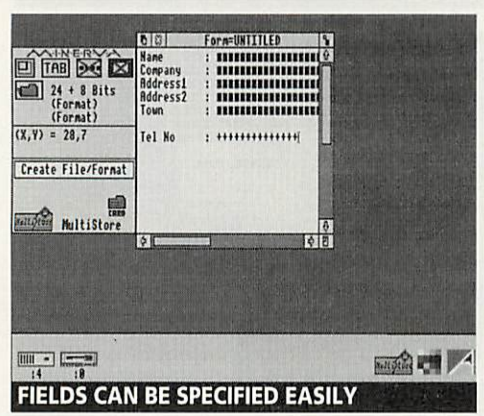
PipeDream is said to break down the barriers between database, wordprocessor and spreadsheet. Strangely enough, however, the database functions of *PipeDream* have been ignored. Many people write off the facilities, claiming that they are a long way short of a full database manager. But in some applications it offers more than a conventional system.



GOING THROUGH A SAVE ROUTINE

You can use the whole of the potential spreadsheet area to hold your data by using the rows as records and the columns as fields. Records can be single or multi-row and the number, length and type style can be changed very easily. The data can be sorted by marking the area and issuing the sort command CTRL-BSO; the search command CTRL-SE can be used to find a record and it is also possible to print and save the various rows which meet the criteria.

The latest version costs £196 from Colton Software, 2 Signet Court, Swanns Road, Cambridge CB5 8LA. Tel: (0223) 311881.



FIELDS CAN BE SPECIFIED EASILY

Another Archimedes database package that had its roots in a BBC micro package is *System Delta Plus.* Strictly speaking it is a set of sophisticated database commands which can be used in conjunction with Basic to build a tailor-made database in a similar way to how *DBase* is used on the IBM PC/compatible. It is supplied with a complete application designed in this way, the *WIMP Card Index,* but there are also add-on support packages available. *Reporter* and *MailShot* will enhance and support the facilities of the card index program. The price is £59 for *System Delta Plus*, and £29 each for *Reporter* and *MailShot* from Minerva.

Pinpoint provides a form designer which will not only help users to collect the relevant information but is also an easy means of input for the resultant data. This is then automatically converted into a database where it can be analysed for patterns and correlations, and a range of graphs plotted. It is therefore the complete tool for anyone who is working on opinion surveys, or looking at performance figures, experimental observations, statistics and even election results. The database costs £99 and is available from Longman Logotron, 124 Cambridge Science Park, Milton Road, Cambridge CB4 4ZS. Tel: (0223) 425558.

The ease that a database can be set up is of crucial importance and *Squirrel* from Digital Services must be one of the easiest. The pointer is positioned where the field should start and dragged to where it should end. As the button is released a dialogue box appears, requesting details about that particular field. The searching of records is just as easy to organise through Query forms. *Squirrel* uses modern indexing techniques to ensure that you get super fast searching every time. You can even change your query into a flow chart, with filters showing which records are chosen and which are filtered out. Although *Squirrel* lacks the relational capabilities of *MultiStore* for example, it will suit users who want a powerful database but who find the setting up of the fields and records quite difficult. It costs £129 and is available from Digital Services, 9 Wayte Street, Cosham, Portsmouth, Hants PO6 3BS. Tel: (0705) 210600.

Some of you may also be interested in specialist databases for storing and retrieving textual material. Archimedes users have two possibilities – *Hyperbook* from Longman Logotron and *Knowledge Organiser* from Clares. *Hyperbook* is a text retrieval system designed to help users do more effectively what they can already do with printed books. It can scan text, provide lexical information and print out either. Its special indexing system allows users to carry out sophisticated searches of the text, retaining the results in a way that assists the researcher in developing multiple themes and following up cross references. A variety of text databases are already available covering themes in literature, history and the environment. Prices are £49 for the Reader and £15 to £25 for text files from Longman Logotron. *Knowledge Organiser* is £55.30 from Clares. For further details on any of the databases mentioned, contact the suppliers. All prices exclude VAT.

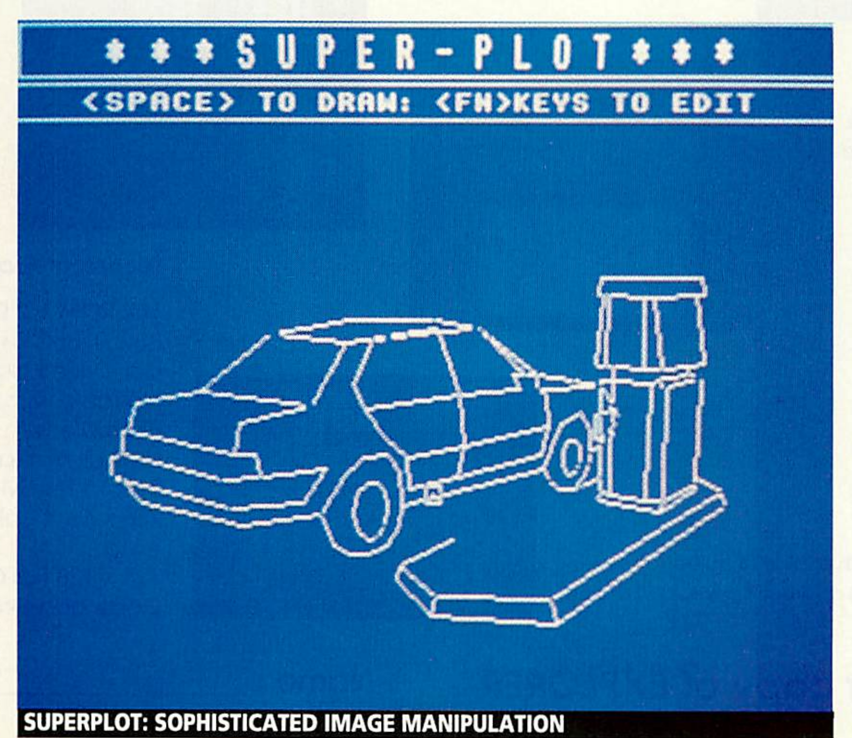
Next month, we will be looking at the various spreadsheet packages available for the Archimedes.



ART ATTACK

Classic graphics take centre stage this month: plot a new course with our object-oriented drawing program, or make a splash with a spot of painting

Beeb users can be forgiven for thinking that object-orientated graphics is only possible on fast, expensive machines such as the Archimedes. In fact, despite its age, the Beeb is quite capable of some relatively sophisticated object manipulation. For example, **Jonathan Baldwin's** *Super Plot*, which first appeared in the November 86 issue, showed that even in mode 2, it is possible to create, move, stretch and rotate line drawings. Once an image has been drawn it can then be dumped on to a plotter, with all the increased resolution that this offers. Or, if you prefer, it can be converted to any mode you wish and then loaded into a 'conventional' painting program to be coloured in.



SUPERPLOT: SOPHISTICATED IMAGE MANIPULATION

There are two listings on the yellow pages for *Super Plot*. The first, *SPsource*, assembles the various transformation routines and only needs to be run once to assemble the code. *Super Plot* is the main part of the program. It runs at &2300 and stores all its data from &1500 upwards; it will not therefore run on a standard BBC or Electron with ADFS.

Assuming you enter both listings correctly, running *Super Plot* will present you with a blue screen with three options. Option 3 will load a saved file if no screen image exists; if a screen image does exist press 2 instead. Alternatively, press 1 to enter the editor. Here, press SPACE to start rubber-banding a line and use the cursor keys to move the end point. F1-F3 control the speed of the cursor. A second press of SPACE will fix the line, RETURN will discard it. Existing points on the screen can be joined by pressing F5. Use the left and right cursor keys to move the box to the desired point, press RETURN, then move to the end point and press RETURN again. Misplaced points can be corrected with F7. Select the point with the left and right cursors and RETURN, as with line adding, then move the point as necessary with the cursor keys. Pressing RETURN again will fix the point again. Two routines are provided for deleting lines. F6 will remove a complete line; select the line with the left and right cursors and



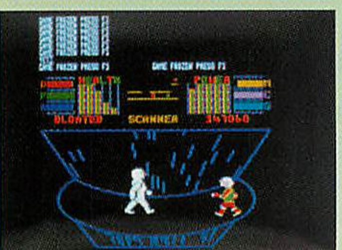
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press RETURN to remove the line. Press F8 to get the 'hidden line' editor and can be used to remove line segments that are partly obscured. Select the line as above, then select an end with SPACE and RETURN. The line can then be moved with the cursor keys. RETURN will fix it at its new position and SPACE will restore the original line. When not rubber-banding, various other 'macro' facilities are provided. F4 mirrors the image about the vertical axis.

The rest of the functions are selected by holding down SHIFT and one of the following: cursor keys, move the whole image around the screen. Key Z rotates the image anti-clockwise. (This and F4 allow vertical mirroring). F7 and F8 shrink and enlarge the image. Used in conjunction with the point editor, this allows finer control over the position of points. F3 and F4 shrink and enlarge about the x-axis and F5 and F6 about the y-axis.

Pressing ESCAPE will exit from any function of the editor leaving the current file and image intact. To exit the program press TAB. There are two ways to save a completed picture: If it is to be continued after saving, press F0 and enter a name. You can then continue editing by pressing 1. 2 or 3 can be used to load in another file. To save an image or delete it and start a new one, press TAB followed by Y to delete it or N to keep it. If it is deleted, it is removed from the screen, but any previously loaded images are left intact. Pressing 1 now will begin a new image. DELETE will remove *all* screen images and the current file, so use this with care!

To produce a composite picture, draw or load each of the components and move, scale and rotate them into the correct positions on the screen before saving them separately. Then run the additional program *Convert*. This will ask for a screen mode and then prompt for the various file names to include in the picture. Pressing RETURN by itself will prompt for a filename to save the completed picture. These pictures can then be loaded into any suitable painting program. The easiest way to load *Super Plot* files into a program of your own, for example a plotter driver, is to include a copy of PROCload from the editor.

One point of interest in the code is the rotate routine. This seemingly very tricky procedure is performed by a few lines of 6502 code. This is how it works: The new co-ordinates are calculated using the existing co-ordinates and the angle of rotation, *a*:

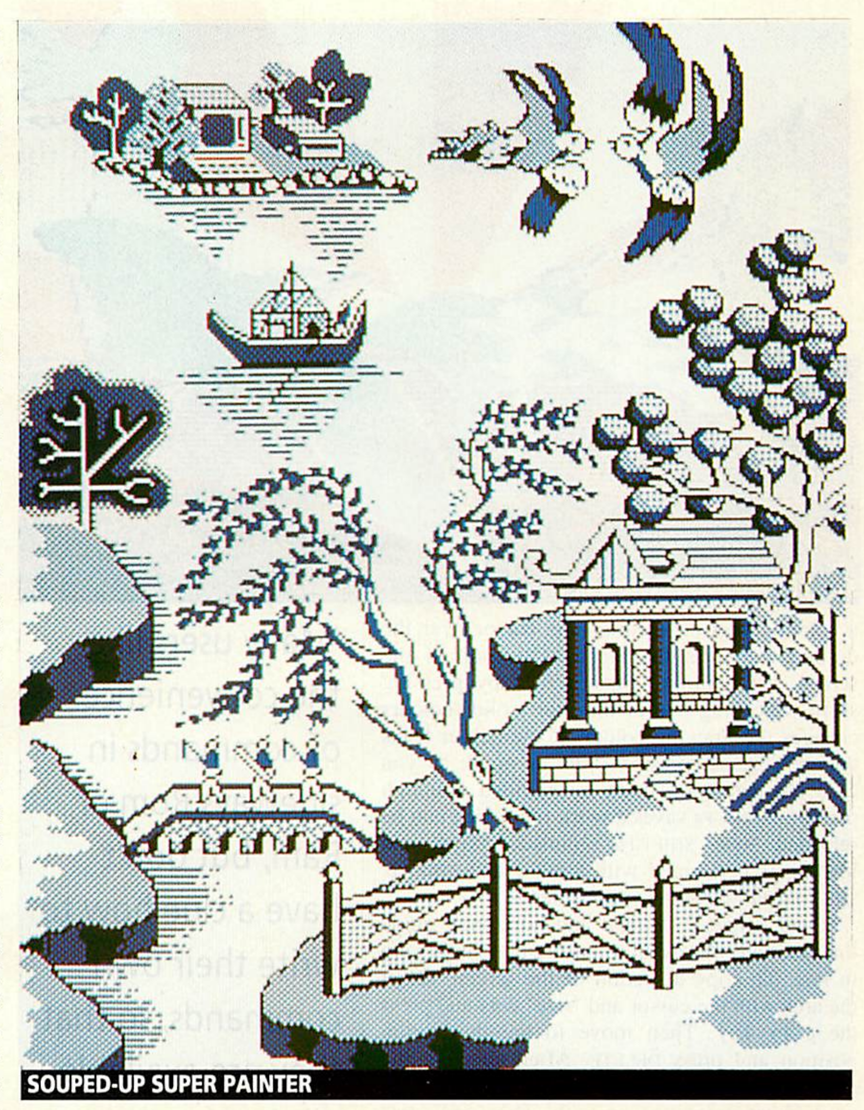
```
X' = X cos a - Y sin a
Y' = Y cos a - X sin a
```

The sines and cosines are calculated using their Taylor expansions and *a* is taken to be 1/16, cos *a* is then 1-1/512 and sin *a* is 1/16. The formulae for the rotation are therefore:

```
X' = (X - X/512) - Y/16
Y' = (Y - Y/512) + X/16
```

and all the division can be achieved by using simple LSRs. A very neat solution.

You should be able to see from the pictures on these pages that *SuperPlot* is a highly versatile program which could be used to create cartoon strips, decorative borders or title pages. Of course, what you could really do with now is a quick and simple to use painting program, so how about Jonathan's own *Super Painter* program from *BBC Acorn User*, January 86?



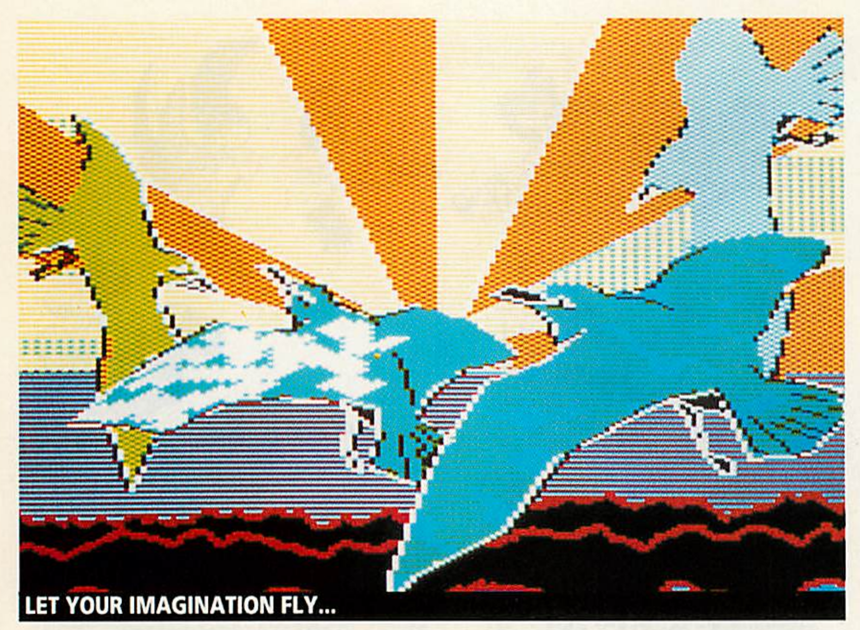
SOUPED-UP SUPER PAINTER

> 'Super Plot and Super Painter make ideal partners. With an eight-bit machine and a small amount of imagination, some impressive results can be obtained'

SUPER PAINTER

With *Super Painter*, Jonathan took the bones of **Rob Fenton**'s mode 2 painting program, *Paintbox* (February 85), converted it to Mode 1 and included **Peter Sandford**'s colour fill routines from January 85 (and Pieces of Eight, June 91). He also improved the circle drawing routine, included a procedure for drawing elliptical arcs and added extra functionality to the block copy routine to allow mirroring.

On running the program, you will be presented with a cursor in the middle of the screen, a status bar at the bottom and a selection of colour fills at the top. The cursor is moved with the cursor keys, and its speed can be controlled with - (slow), + (medium) and * (fast). Alternatively, [will slow it down and] speed it up. The dots around the cursor indicate the resulting size of various of *Super Painter*'s operations. For example, pressing F0 draws a rectangle between the dots and F1 draws an ellipse. These can be made solid with F8 or dotted with F9. F7 reverts to outlines. The dots can be moved into relation to the cursor with A, Z, < and >. Other shapes can be drawn by rubber-banding. O toggles between this and the cursor. Press F to fix the line or S to start a new one. Single dots are placed with D. Fill the drawn shapes by pressing F3. To choose


LET YOUR IMAGINATION FLY...

a colour, press F5, position the cursor over the desired colour in the menu at the top of the screen and return to main screen by pressing SHIFT. Choosing one of the four 'solid' colours changes the drawing colour. If the colour leaks out of a shape, press ESCAPE as quick as you can! No automatic undo is provided although pressing SHIFT-F4 saves a work file which can be reloaded with SHIFT-F0. Named saving and loading is performed with SHIFT-S and SHIFT-L. SHIFT-F6 will clear the entire screen.

V and H toggle vertical and horizontal guide lines on and off, useful to ensure that shapes are in line. To copy a section of the screen, select the area with the cursor and 'size' dots and press the COPY key. Then move to the destination position and press DELETE. After selecting the area, M and N can be pressed to select left/right or up/down mirroring or both. The 'size' dots can also be used as an airbrush; pressing F4 will plot a random smattering of dots in the current colour within the area of the dots.

As mode 1 only has four colours available pressing C will allow you to select these four from the full range. Keys 0 to 3 cycle through the available physical colours for each logical colour; RETURN makes the choice. The final function, arc drawing, is quite complex. Pressing F6 will show a simple ellipse which can be moved with the cursor keys, rotated with CAPS LOCK and CTRL, and magnified and reduced with > and <. Its proportions can be altered using A and Z, SPACE will remove it and redraw it at the cross, and RETURN will fix it in place.

To draw an arc, press SHIFT, move the cursor around the ellipse using SPACE and select the start point with RETURN. Repeat the process for the end point. The only restriction is that the end point must be further clockwise than the start. Pressing F6 again will provide the original ellipse again – this is useful for drawing identical objects.

Jon deliberately made the program open-ended to allow it to be easily tailored for your own needs. Memory is a little tight on an unexpanded BBC, although many of the procedures could be shortened by joining lines and shortening variable names.

'Many users like the convenience of commands in sideways Rom or Ram, but don't have a clue how to write their own commands, so that they are available all the time'

As can be seen by some of the pictures on these pages, *Super Plot* and *Super Painter* make ideal partner. Of course, the Archimedes can do all this with *Draw*, giving many more facilities. However, with an eight-bit machine and a small amount of imagination, some impressive results can be produced.

DO-IT-YOURSELF ROM

During a recent chat with Rob Miller, he said that one of the most popular features in the magazine, during his time as technical editor, was my automatic sideways Rom generator, *AutoROM*. This appeared in *BBC Acorn User* March 88 and was designed to take the drudgery out of writing sideways Rom images. It was a useful feature because, many users like the convenience of commands in sideways Rom or Ram, but don't have a clue as to how to write their own commands, so that they are available all the time.

In essence, *AutoROM* is a mini-filing system, a bit like a Ram disc. Existing machine code utilities can be 'cached' by the Rom and stored in sideways Ram. If the Rom detects that you are trying to run one of the commands it has cached, it 'downloads' the utility and runs it itself rather than loading it in from disc. The code itself is about 1.5K long, leaving just under 14K free for the storage of utilities. Four inbuilt commands are provided for accessing the storage area of the Rom. When the Rom is first loaded, you must issue a *CLEAR. This ensures that all the data tables used by the Rom are reset to sensible values and that the storage area contains no spurious data. A machine code utility can be stored in the Rom by typing *CACHE followed by the filename of the utility. Assuming the file can be found and there is enough space left in the Rom, the file will be loaded in and copied into the storage area.

There are two ways to find out what commands have been cached. You can type *DATA, which will list all the commands along with their load and execution address, lengths and positions within the Rom. The number of bytes left in the storage area is also shown. The other way is to type *HELP AUTOROM. This gives the usual format help text describing the commands provided by *AutoROM*. Underneath this is a name-only list of the files cached. *SCRAP removes files from the Rom. As mentioned above, *CLEAR can be used to re-initialise the Rom, a bit like formatting it ready for use.

The source code for two star commands can be found on the yellow pages for you to try out the facilities of *AutoROM*. The first, *CHECK, provides a very simple command that tells you if a word is a palindrome or not, while *PHONE produces, well, run it and see...

It is important to note that when you are using *CACHE, files are first loaded into normal memory, so it is vital to ensure that this will not interfere with what you are currently doing. If a utility normally loads and runs at &0900, then it will do so when *CACHEd. Using *AutoROM*, you can collect together all those often-used machine code utilities into a single customised toolkit Rom. The whole collection can then be saved as a Rom image using *SRSAVE on a Master, or *RSAVE or similar on a BBC.

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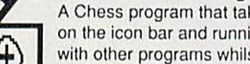
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'PCB Auto-route is remarkable. No similar software comes near the price'
Acorn User – August 88

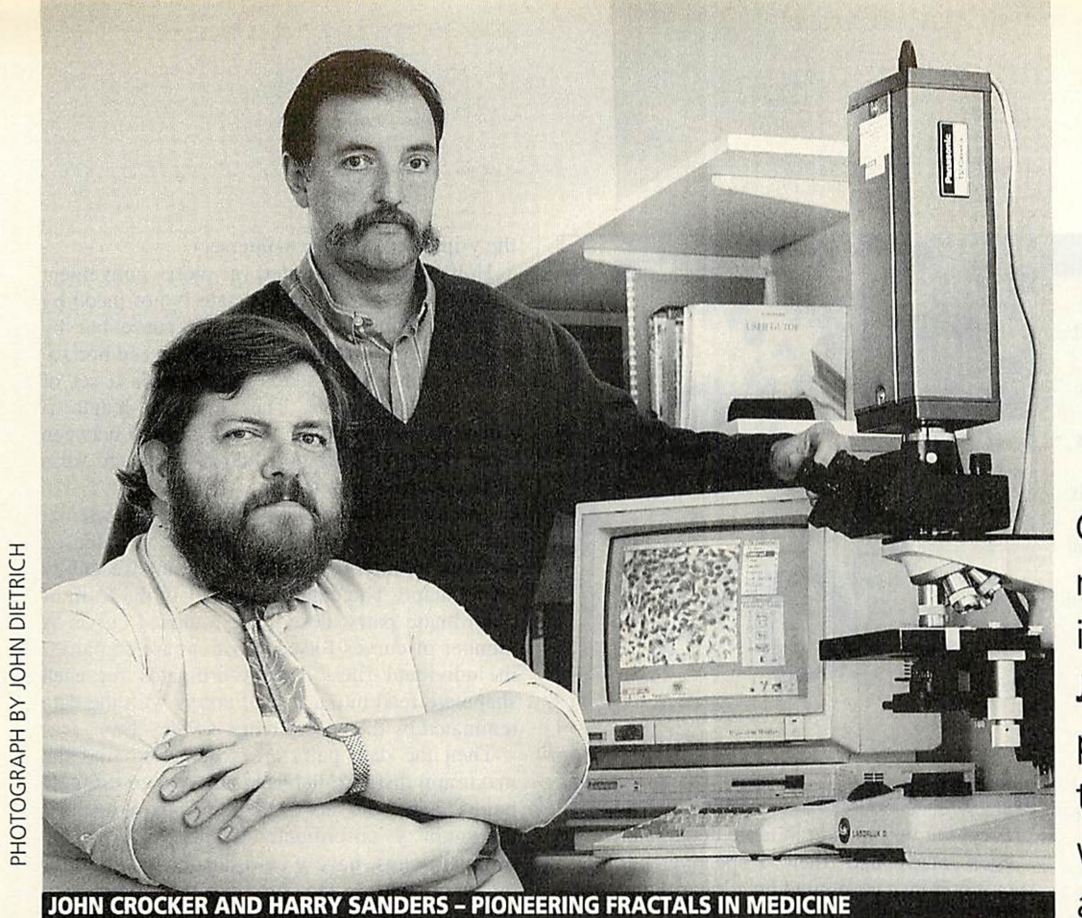
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JOHN CROCKER AND HARRY SANDERS – PIONEERING FRACTALS IN MEDICINE

Cellular shapes are not easy for scientists to categorise. **JOHN CROCKER** puts them under the microscope, with the help of an Archimedes

TISSUE OF LINES

Walking into the pathology department in a certain Birmingham hospital, you will find an Archimedes 440 hard at work on a rather unusual task. It is helping to assess the shapes and sizes of cancer cells.

The Archimedes was chosen by the group at East Birmingham Hospital, led by myself and Harry Sanders, for its powerful graphics and speed. These assets make it ideal for the study of microscopic images. The aim is to investigate the properties of cancer cells, but the study also helps to make an early diagnosis of surgical specimens, which can, in its turn, lead to an appropriate treatment.

There have been many studies that deal with the size of structures in cancer cells, but dealing with their shape is much more tricky. Conventional shape-measuring parameters, such as the form factor (an approximate measure of the 'roundness' of an object) are relatively crude. Furthermore, they tend to apply to grossly distorted forms and will not distinguish between, for instance, a thin cigar-shaped object and one with a star-shaped profile, like those shown in the diagram. This is a major problem, since in many areas, not only in the biomedical world, shapes tend to have irregular borders. Indeed, this is the case with the specimens in question and is where the Archimedes can help.

To get the images into the Archimedes, the investigators make use of a high-resolution, black-and-white video camera (mounted on a Leitz research microscope). The next stage is to transmit images to the Archimedes, via a Watford digitising board.

Alternatively, photographs are produced in an electron microscope and traced on a digitising pad, again linked to the Archimedes. Then it is over to two Archimedes packages.

The first is a program called *Digit*. It enables structures to be fully digitised and stored, either as video frames or digitised outlines. The next stage is to analyse this data. This is achieved with an excellent software package, called *First*. To overcome the problems of shape measurement, we have made use of fractal dimension analysis. This, of course, has a connection with chaos theory, a highly topical new branch of mathematics.

Fractal dimensions allow researchers to study shape accurately. They are used to obtain a measure of the regularity with which a curve fills a space. A point in space which is infinitely small has a dimension of zero, that is to say, it fills no space. A single straight line composed of an infinite number of points has a dimension of one and a plane, taken to be an infinite number of straight lines, has a dimension of two. A curve, composed of a number of straight lines, can be considered to have a value between one and two: it fills the space more than a line with dimension one but less than a complete plane with a dimension of two.

An estimate of the fractal dimension of a curve is made as follows: a series of estimates of the perimeter length of the curve is obtained using successive step sizes and then step sizes and perimeter measurements are normalised – a

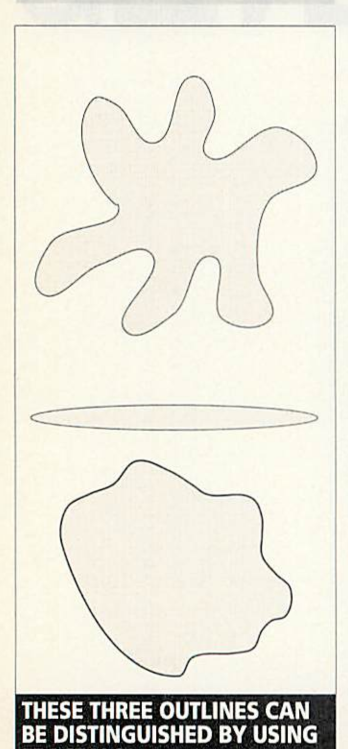
SPOT THE BAD GUY

A cancer cell is a normal cell that has gone 'rogue', meaning that it replicates without limit, producing an, often malignant, tumour. Given their tendency to spread, early diagnosis of cancerous cells is vital.

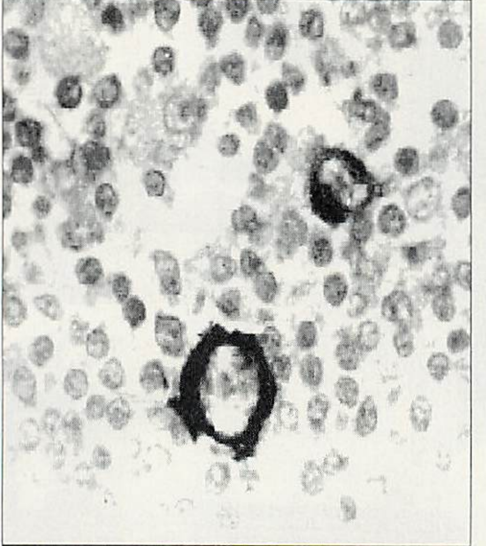
It now looks as though there is a range of causative factors behind the single 'disease' we call cancer. The most well-known cause is chemicals – we've all seen the warnings on cigarette adverts. Also identified are hard radiation, viruses, and genetic time-bombs within the body's own cells – the so-called 'oncogenes'.

The causes all involve one vital function of the human cell – replication, or to give its full name, mitosis. One particular cell structure is vital to this – the nucleus, containing the genetic material DNA. In a healthy cell from a given area of the body, the nucleus will take the shape of an oval of a given aspect ratio.

Cancer cells give themselves away. If DNA mutation leading to cancer has taken place, the nucleus and its internal structures, including a small body known as the nucleolus, may appear distorted in shape. This distortion is not always obvious to the human eye, so computers like the Arc can make a vital contribution to saving lives.



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CANCER CELLS IN NORMAL TISSUE

process we will look at in more detail later.

Step sizes and their respective perimeter measurements are plotted on a logarithmic graph with the former as the x-axis, and the slope of the plot is found. This resulting slope gives the fractal dimension. In fact, the slope of the plotted points is negative and indicates that part of the fractal dimension above one. Thus the true fractal dimension is the value of the slope multiplied by (-1, +1).

The fractal dimension can be calculated for a range of step sizes. In fact, different step sizes often produce different fractal dimensions. This is because they reveal different features of the curve under study. A curve with an irregular overall shape, but a generally smooth surface, is a typical case. It will have a large fractal dimension for a range of large step sizes. In other words, large steps will display the large features of the overall shape.

On the other hand, the fractal dimension for a range of small step sizes will be small. This is because small step sizes will display the generally smooth features of the surface. Conversely, a curve with a regular overall shape, but an irregular surface, will show a large fractal dimension for small step sizes and a smaller fractal dimension for large step sizes.

Perimeter length is also needed and a manual way to estimate the perimeter length is to set up pair of dividers to the step length and 'walk' the dividers along the curve. The number of steps multiplied by the step size gives the perimeter estimate. These measurements can then be plotted. The perimeter is needed for each step size. Before plotting, however, the step size and perimeter length must be 'normalised': this is done by dividing them by the maximum distance between any two points on the curve.

The step size and perimeter estimate are normalised in order to standardise the dimensions of the shapes and remove any effect on the results which could be attributed to the actual size of the shape. The slope of the plot can be found manually by deriving the optimally fitting straight line which passes through the plotted points. This line is extended to where it intersects the x and y-axes; the slope of the line and the fractal dimension are given by the ratio of the y-intersect and the x-intersect.

However, we adopted a more convenient method. The perimeter estimate is not made by summing equal steps along the curve but by laying a set of imaginary, equally-spaced horizontal lines over the shape. This yields a set of points on the curve. The perimeter length is calculated by finding the distances between these points and the procedure is repeated for a different spacing of the lines.

The method is equally valid since the calculation of a fractal dimension calls for an unbiased method, in other words one that is unaffected by curve shape. The data obtained is in the form of co-ordinate pairs, describing a closed curve. A number of curves for each patient are contained in individual files. The co-ordinates for each shape are read into a pair of arrays with the data teminated by the co-ordinates, (-999, -999).

Then the data pairs are scanned to find the maximum distance between any two co-ordinate points and also to find the maximum and minimum y co-ordinates. When two of the original points have y co-ordinates which differ by more than 1, the intermediate points, with successive integer co-ordinates, are calculated. These are put into to the new arrays.

After this process, the new set of co-ordinates will contain successive y co-ordinates which differ by zero or one, starting with the smallest y co-ordinate. This is then used to calculate the perimeter estimate. Different step sizes are determined by taking separations of y-axis points. The smallest step size possible is one. In this case, all data points in the new data array pair are used.

The perimeter estimate is the total of distances between each point. The next possible step size is two (since all y co-ordinates in the new set of co-ordinates are integers). So the perimeter estimate is derived by summing the distance between every second y co-ordinate. Where successive y co-ordinates are equal, and the first point is included, then all successive points with the same y co-ordinate are used.

Where the step size is three, every third y co-ordinate is used, and so on. The first point is always used at the end of the series of points to close the curve, so that the perimeter estimate is always calculated from a set of points which start and end at the same point. Once the step sizes and perimeter estimates are normalised their logarithms are calculated. As each pair of logarithms is calculated, an estimate of the slope of the line joining the points is calculated by regression analysis. This gives the basis for the fractal dimension of each curve.

The fractal dimensions of a number of curves are calculated for each patient and their mean is worked out. It is then possible to relate these values to other parameters which may also be used in diagnosis or patient care.

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- **Supplier:** Brian Hayes Software, 31 Priory Gardens, Berkhamsted, Herts HP4 2DS
- **Product:** First
- **Supplier:** Serious Statistical Software, Lynwood, Benty Heath Lane, Willaston, South Wirral, L64 1SD

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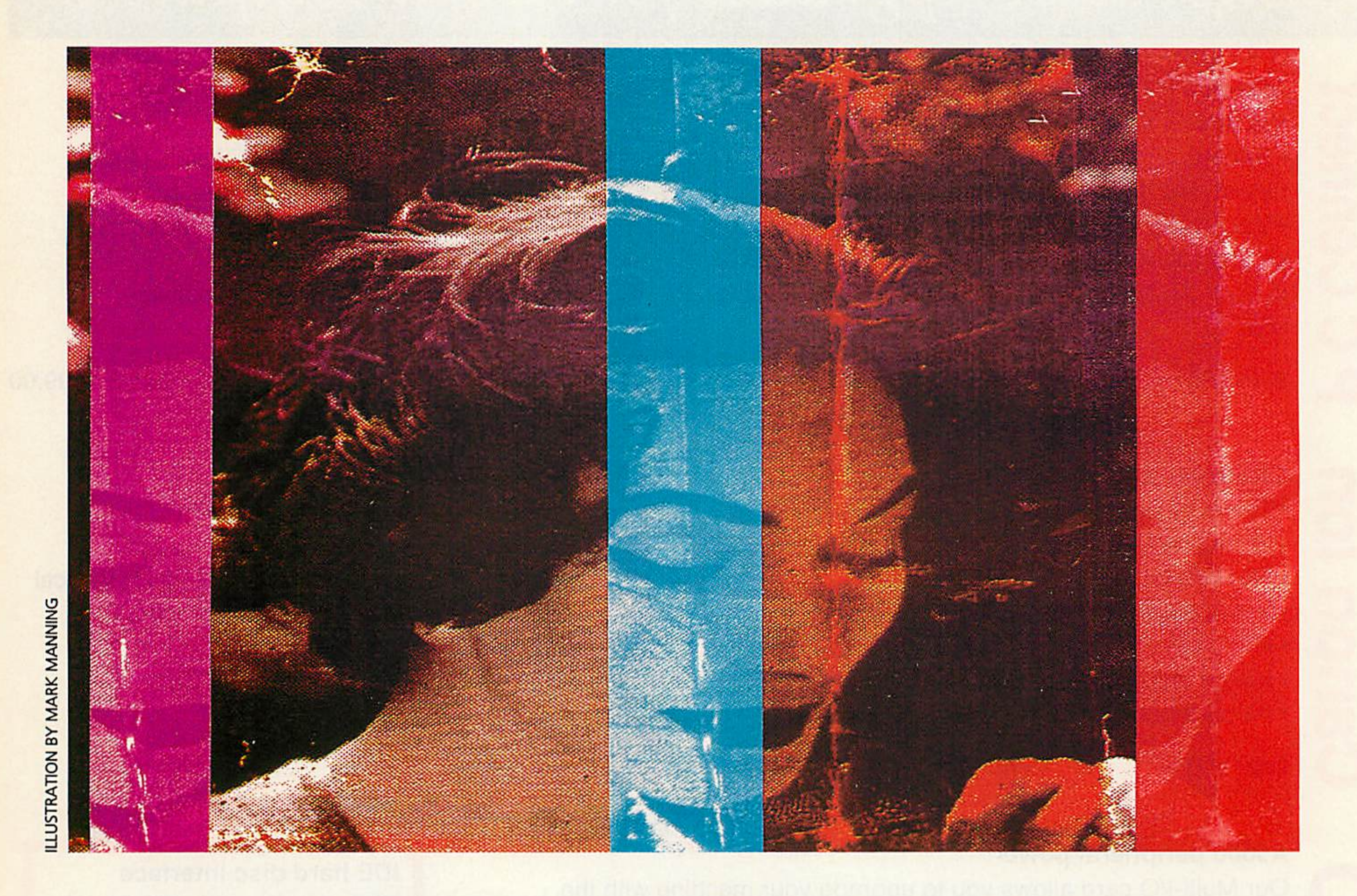
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ILLUSTRATION BY MARK MANNING

MODUS OPERANDI

IAN WILSON offers a program that will help you to fine-tune your Archimedes sprites

Have you ever created a good sprite on your Archimedes or A3000 and then wished you had started in a different screen mode, or used non-desktop colours? Or changed your mind about the dimensions of the sprite when actually putting it to use? *Paint* is a first class sprite editor, but lacks the facility to alter the mode of a sprite or its size. My program, *SprEd*, in this month's yellow pages, has been written to complement *Paint* and enable you to fine-tune your Archimedes artistry.

Type in listing one (or load it from the monthly disc), debug and run it to create the application directory SprEd within the currently selected directory. Next, type in the second listing, debug it and save it as *RunImage* into the SprEd directory. To load *SprEd*, double click on its icon and it will appear on the right hand side of the bar. You can now start editing sprites.

Load a sprite file by dragging its icon to the icon bar and *SprEd*'s main window will open. The editing window is divided into two sections: on the left are details of the sprites in a file as they already exist, while on the right are details of the new sprite to be produced for each of the originals. Use the arrow icons to scroll to the sprite that needs editing, then editing operations can be performed on the right side of the window. Enter the new mode number from the keyboard (click on the mode number icon to gain the caret) and adjust the sprite's dimensions using the arrow buttons. The new sprite will be created when its icon is dragged to a directory viewer or sprite file window.

If it has a valid pathname, you may click on the OK box. To save several sprites as a single file it is best to drag them to a *Paint* sprite file window which can then be saved as one. Large sprites may take several minutes to copy.

Changing the mode of a sprite does not in itself alter its size in pixels, but may alter its physical size on the screen. For example, a mode 13 sprite made from a mode 14 original will have double the width of the original because mode 13 has bigger pixels. To compensate for this you may give the new sprite half the width of the original.

Further options are available from the menu within the main window. By default a sprite's desktop colours are copied to the desktop colours of the new mode, but permutations of desktop and actual colours are allowed. For example, if you select 'desktop to actual', a sprite originally designed for the desktop may be used outside the desktop in the 'native' screen mode. Where a native mode has flashing

colours, only the first colour of a flashing pair is used. If a sprite has its own palette, this palette may be copied to the new sprite if the new mode has the same number of bits per pixel (in fact, this is the default option). It is not always be possible to copy a sprite exactly in a new screen mode as the sprite's colours may not be available in the new mode. *SprEd* finds the best approximation to each colour for the new mode.

The program uses the ColourTrans module which is loaded from the System directory. A sprite created by *SprEd* is copied, pixel by pixel, from its original, and each colour number in the new mode compared with the original in a translation table at address Palette%. SWI ColourTrans_SelectTable creates this table, given the incoming and outgoing modes and palettes. Unfortunately, this gives insufficiently accurate results when 256 colour modes are used, so palette entries are calculated from colour numbers and vice versa in PROCinvert and PROCconvert. The default desktop palette for each mode is loaded into the address Table%. Other palettes are available either as 'default for mode' or the sprite's own palette.

When a sprite file is loaded into *SprEd* it claims enough memory from the free pool using the SWI Wimp_Slotsize (this memory may be reclaimed by clicking Clear on the icon bar menu) and any new sprite is created in another chunk of memory from the free pool, which is then released when the sprite has been saved.

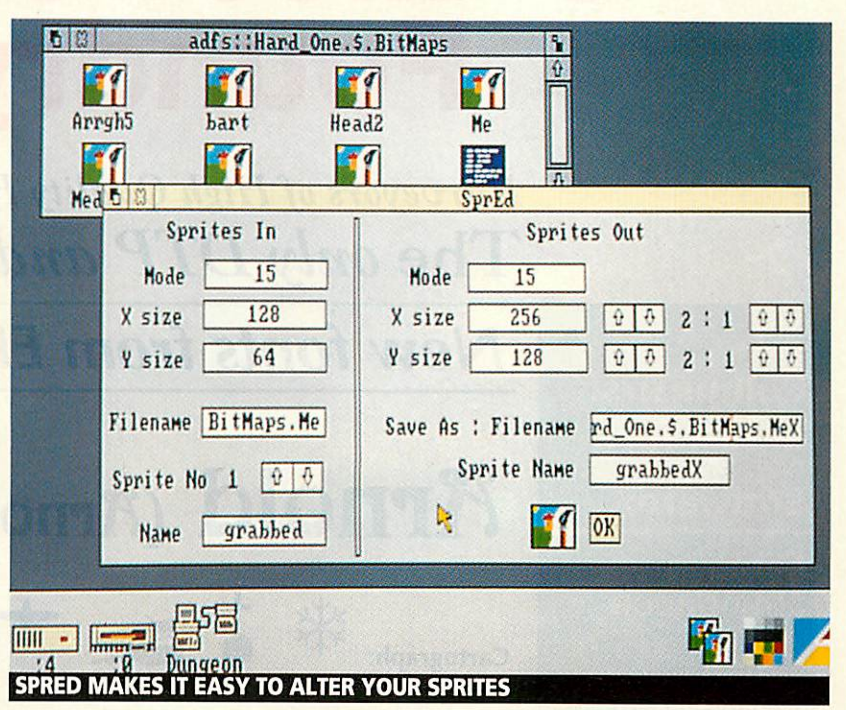
Sprites are transferred to and from other tasks by direct memory transfer or, if the external task does not support this, a scrapfile is used.

The Archimedes series has a good choice of screen modes and even with a standard colour monitor, 16 modes suitable for displaying sprites are instantly available. These graphics modes differ from each other in the physical size of each pixel and the number of bits of memory required to represent each pixel, and hence the number of available colours. In colour modes 2, 4 and 16 the actual colours used may be altered from the default colours by substituting 'logical' colours, although no greater number of colours is available at any one time. In the case of 16 colour modes there are eight steady colours and eight flashing colours – this provides backward compatibility with the eight-bit BBC micros.

The Risc OS desktop adds a new dimension to the story. There are 16 colours available, all of which may be defined by the user – and there are no flashing colours. The desktop will display the best approximation available from its palette to any colour of a sprite and, if the desktop is used in modes of two or four colours, ECF (Extended Colour Fill) patterns are used to increase the number of colours apparently available. If you leave the desktop without issuing a mode change instruction, the desktop palette is still available to you but, once you change mode, the palette is as described above.

Making the situation yet more complicated is the behaviour of the 256-colour modes – these are the same inside or outside the desktop.

A sprite is an area of the screen saved into memory. Its data includes its size in pixels in x and y dimensions and the screen mode in which the sprite was created – hence the number of bits per pixel in the sprite map. Therefore, although



SPRED MAKES IT EASY TO ALTER YOUR SPRITES

it is perfectly possible to display a sprite in a mode other than that in which it was created, its appearance may not be as it was intended.

A sprite may also have its own palette which is stored as a translation table in the sprite header. Such a sprite will, as before, be displayed on the desktop in the best approximation to its own colours using the available palette. However, in native mode it is displayed simply according to the colour numbers used.

A palette entry is a word in memory of the form &BBGGRR00 where the three most significant bytes give the amount of red, green and blue respectively. In fact only the first nibble of each byte is used by the present hardware so that &BXGYRZ00 will give the same colour as &BUGVRW00. The Programmer's Reference Manual advises that you make both nibbles of each byte the same to maintain upward compatibility, but I have found no examples of software that have actually done this. So it follows that there is a total of 4096 colours, since there can be 16 levels of each primary in any mixture.

In 256-colour modes there are only 64 colour numbers and each one is defined in binary as %PC%BbGgRr and the total number of colours is extended to the maximum by four possible levels of 'tint'. So it is quite easy to calculate the nearest possible 256-colour mode colour to a palette entry and easier still to calculate a palette entry given a colour number and tint value.

VDU 19 provides several options for defining the palette of your screen mode. This call enables definition of each logical colour as a physical colour or to create a palette in terms of red, green and blue components.

You can try displaying a few sprites in various modes inside and outside the desktop, and use the program to make families of sprites in different modes and palettes. This description is by no means an exclusive account of the way colours are handled, but it is intended to illustrate the diversity of choice available to you and should whet your appetite for this fascinating and very complex aspect of your computer.

'This program should whet your appetite for this fascinating and very complex aspect of your computer'

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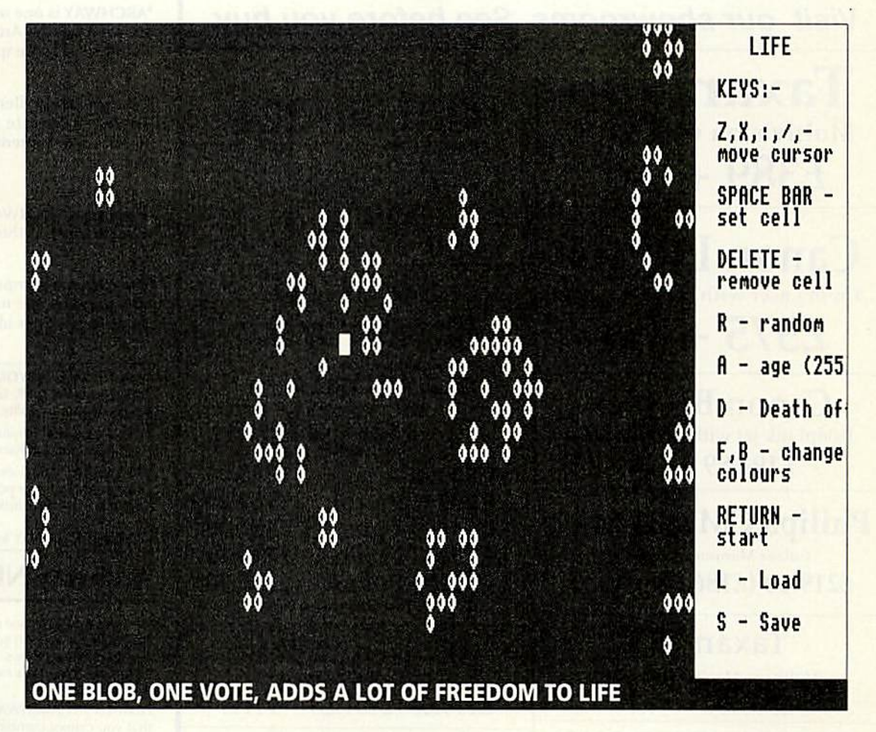
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LIFE IN THE FAST LANE



ONE BLOB, ONE VOTE, ADDS A LOT OF FREEDOM TO LIFE

Just when you think you've sampled all that Life has to offer, along comes another version. JONATHAN HARSTON shows off his high-velocity masterpiece

In the May 90 issue of *BAU*, Phil Bender presented a version of *Life* that was considerably faster than previous versions for the BBC. The algorithm used counts votes cast by cells rather than counting cells themselves and fairly zooms ahead. On average, 15 generations can be displayed every second. However, Phil left his program hanging in the air slightly by having no way to save and load patterns.

Conventional *Life* programs scan through an array of cells checking the number of neighbours each cell has. If a dead cell has three neighbours, a new cell is born. If a live cell has less than two or more than three neighbours, it dies, from loneliness or overcrowding.

A dead cell in this generation can have no effect on the next generation. So, consider an array of cells, and an array of votes cast by cells. First, clear the votes array. Then, each live cell casts a vote for each of its neighbouring cells by incrementing the appropriate locations in the votes array. A cell also votes for itself.

When all the cells have voted, the votes array is scanned. If a cell has four votes, it is either a live cell with three neighbours or a dead cell with four neighbours. In both cases, no change is required, so its vote is cleared and it is skipped. If a cell has three votes, it is either a live cell with two neighbours or a dead cell with three neighbours, so its vote is cleared and if it is not already alive, it is marked as live and printed. In all other cases, the cell must die, so it is killed and removed from the display.

Using this algorithm makes the speed dependent only on the number of cells that change state each generation.

An extra feature added is that cells can die from old age. When each cell is created, either at the editing stage or at a birth, it is born at the age stored in &AFF. The value stored is 256 minus the maximum age a cell can get to.

During each scan of the cells array, the flag at &AFE is checked. If bit seven is set, and the current cell is alive, its age is incremented. If it gets to zero, then it has died, and it is removed from the screen. There is also a check to change the shape of the cell on screen 10 generations before it would die.

Enter and save listing 1. When run, this generates the machine code which is used by the main program. Now enter and save listing 2. This is the Basic control program used to edit and load and save the patterns. The program as listed is quite compressed – most of the variable and procedure names are single letters to save space. Also, don't put any spaces between the line numbers and the actual lines.

When run, you get the list of options down the left-hand side. The new options are the save and load options and death by old age. You can also clear the screen by pressing C, and enter a star command by pressing *. As an alternative to using the Z, X, : and ? keys for editing, the program will also recognise the cursor keys and TAB does the same as DELETE. When quitting from running Life, the pattern stays on the screen so you can edit or save it. To finish, press ESCAPE from the editing menu.

Now, it's time to try entering some patterns. Enter a line of five cells. Move down a row and put one cell under the left-hand end. Now move down another row and put one under the right-hand end. When this pattern is run with old age turned off, it sends colonies of cells swirling around the screen, and stabilises after about 1200 generations. If you turn old age on, though, (indicated by the menu option saying 'D - Death off') it stabilises after about 700 generations, and then dies completely. There are probably patterns that would die out without old age and continue regenerating with old age. The challenge is to find them!

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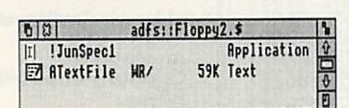
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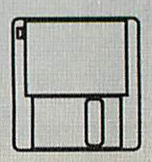
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TOP OF THE WORLD

With the National Curriculum now in full swing, **CHRIS DRAGE** looks at the ways in which computers can help geography teachers

Geography is not generally thought of as a prime target for computer power. And as if to back up this misconception, the geography orders in the National Curriculum reveal only limited computer involvement. The suggestions made in both the orders and the non-statutory guidelines fall a long way short of what is actually possible.

This article aims to correct this by giving you some ideas – there is a lot of potential for using computers in the geography classroom, in ways that can contribute to both the subject itself and the technological expertise of the pupils.

The few examples given in the non-statutory guidelines include creating questionnaires, using databases to search for geographical patterns and comparing the seasonal differences of temperature and rainfall. Within the orders, examples are given of more specialised computer use, such as satellite images and geographical information systems (GIS). Therefore IT in geography can be defined as the use of:

- Wordprocessors for drafting and editing work for displays and booklets
- Desktop publishing for presentation
- Databases to analyse sources, form and test hypotheses and relate results of enquiries to other sources
- Simulations to interpret evidence and study the causes of events
- Monitoring and measuring software to capture, store and manipulate weather data

VISUAL AIDS

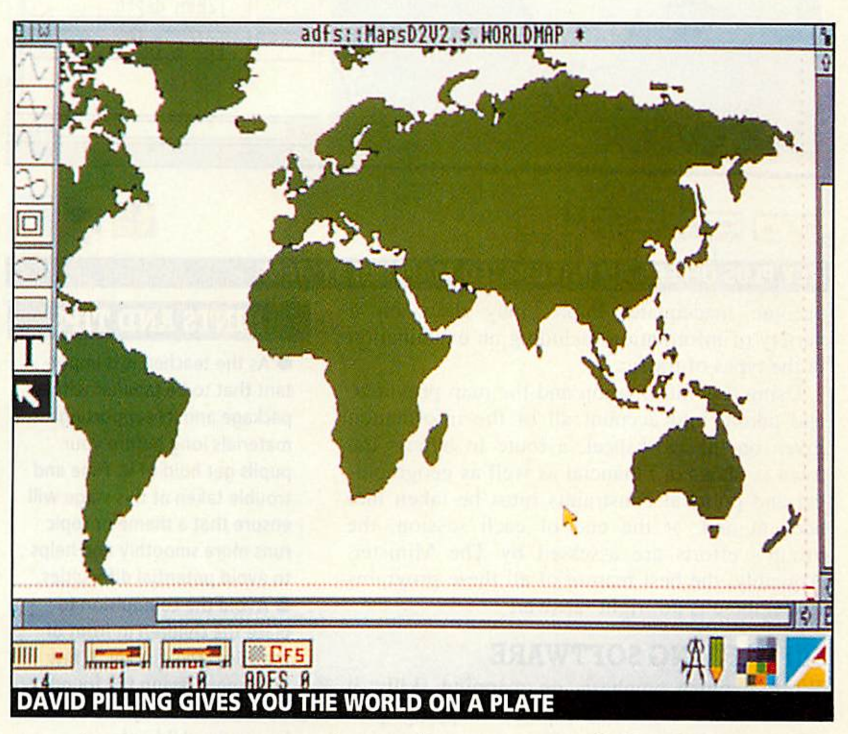
Multimedia, clip art and resource packs are becoming more common, and typically comprise discs of sprite or draw files for inclusion in children's presentations. The *Acorn Educational Directory* is a good place to start looking for material and it is available from your local Acorn dealer. One obvious example is to use maps and we found two good sources. The first is *Panorama*, from David Pilling Software (this has recently replaced *Worldmap* and *The World Digitised*). It will enable you to produce a map of any part of the world, colour it in *Draw* and load it into another program. Other maps in draw file format are available: the *World Geography Maps* pack is of a very high quality.

Multi-lingual typefaces can also find a place in geography courses and a good starting point is the Electronic Font Foundry, which produces Indic, Hebrew, Cyrillic and Greek fonts.

Information handling comprises a major aspect of computer use within the National Curriculum generally and *Key Plus 2*, with its integrated mapping system, will allow you to use data files with locational information. It can be used with *Key Plus* by plotting data onto the maps and printing them out: this is very useful for key stages 2 to 4.

MODELLING

Content-based software comes in the form of simulations. In other words it aims to provide a realistic backdrop to geography lessons by giving the pupils a 'real-life' complex situation. The degree to which the simulation is used is up to the teacher. It can be the focus of a topic with supporting resources, or it may be one of a number of activities on a common theme. For a general program, versatile *Touch Explorer Plus* can provide a framework for all manner of geographical explorations.

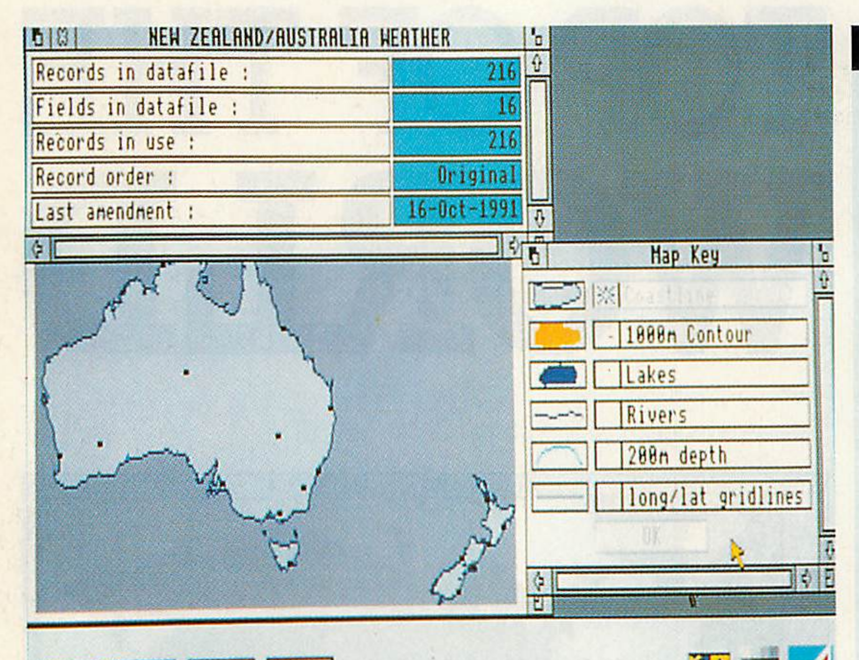


DAVID PILLING GIVES YOU THE WORLD ON A PLATE

Rainbow River is more specialised: children must balance the waste going into a reservoir against the water taken from it. This is a valuable addition to the theme of conservation, rivers and the water cycle and is suitable for use at key stage 3. A title based on a similar theme is *The Water Game* which simulates managing a sparse water supply. There is just enough factors involved to make the game interesting and challenging, despite the rather crude graphics.

Flight Path simulates plotting the course of an airliner and *Search and Rescue* involves planning the rescue of a stranded yacht. Both programs deal with geographical location and variables such as fuelling the craft, mapping the proposed route, and taking the various climatic conditions into account.

A variety of simulations fit into the general humanities/geography area. *The Sea* and *Roads* are two packages which introduce the problems of planning, decision-making and management for pupils at key stages 2 and 3. *The Bypass*, part of the *Roads* package, simulates the need to create a bypass around a town whose roads have



KEY PLUS OFFERS AN INTEGRATED MAPPING SYSTEM

become inadequate. Pupils may draw on a variety of information including an examination of the types of traffic.

Using this information and the map provided, and taking into account all of the information given on the worksheet, a route to bypass the town is planned. Financial as well as geographical and political constraints must be taken into account and, at the end of each session, the group's efforts are assessed by The Minister. Arguably, the best feature of all these programs is that there is no 'right' answer.

SUPPORTING SOFTWARE

With so much emphasis on mapping skills, it makes sense to use computer mapping programs, as they tend to offer more interaction than atlases and can be very motivating.

General Map Reading and *Coastal Map Reading* apply the principles common to many map programs to Ordnance Survey maps. Interpreting symbols, orientation and compass readings, plus eastings and northings, forms part of these packs. Similar packages include *Introducing Map Skills 1 & 2, Maps and Landscapes* and *Geomapping*. The latter converts contour maps into 3D landscapes which can be rotated and viewed from different directions – a valuable resource for key stages 3 and 4.

By using colourful animated graphics *Mapventure* helps key stage 2 pupils to understand what maps are representing. Using four compass point views, the children navigate their way around an environment, in the context of an adventure. This concept is taken even further in *Viewpoints* where 'photos' can be taken and a database created from their findings.

Finding software suitable for younger children is always a problem. Two such programs are *Shops and Supermarkets* and *Camping* – for children with a reading age of at least a seven-year-old. Year three pupils can attempt the tasks quite independently. In *Shops and Supermarkets*, which uses a Concept Keyboard, children practise their shopping skills. *Camping* simulates a weekend camping trip which must be carried out successfully and safely. The most impressive feature of both these packages is the range of photocopiable support materials and the ideas presented.

The ageing but worthy Dudley Programs consist of six theme packs – *Travel, Homes, Myself, Weather, Food* and *Exploration* – and form a coherent resource base for project work.

Lastly, using *Designer Environment*, the computer can provide a link with design and technology. An environment, complete with telephone boxes, churches and mosque can be designed by pupils on-screen. The pieces are then printed out, complete with glueing tabs and a map to position them on. This is a useful program that allows children to reconstruct their local area and to identify problems and even make improvements. For a more complete description of this series, see the September 91 issue of *BAU*.

HINTS AND TIPS

- As the teacher, it is important that to be familiar with a package and its supporting materials long before your pupils get hold of it. Time and trouble taken at this stage will ensure that a theme or topic runs more smoothly and helps to avoid potential difficulties.
- Avoid the compulsion to place the children in front of the micro too quickly. A few days spent laying the foundations for the study and building on the children's background knowledge will be time well spent.
- Although it has been stated many times before, work away from the computer cannot be emphasised enough. The children will be willing to research, write, illustrate and build, as a result of the excitement that has been generated by the computer.
- General computer software – wordprocessors, desktop publishers, hypermedia and text revelation programs can also be used to help geography studies. We listed a range of these in the November 91 issue, on page 84 in our table entitled Information Handling.

PRODUCT DETAILS

- Panorama, disc number 33, £5.99, for the Archimedes range, from David Pilling Software on (0253) 852806.
- World Geography Maps, £25.50, for the Archimedes, from Micro Studio Ltd on (0353) 720433.
- For a free disc catalogue and price list of its available fonts contact Electronic Font Foundry on (0344) 28698.
- Key Plus 2, from ITV Association on 071-247 5206. Prices from £65, depending on the size of the school.
- Touch Explorer Plus, £17.50, for the BBC B, B+ and Master 128, from Microelectronics Education Support Unit. For more details contact NCET on (0203) 416994.
- Rainbow River, for the BBC range, from Cambridge University Press on (0223) 358331.
- The Water Game is available from the Centre for World Development, Regent's College, Inner Circle, Regent's Park, London NW1 4NS.
- Flight Path and Search and Rescue, £25.52 for the BBC range and £28.51 for the Archimedes range, from Storm Software on (0963) 22469.
- The Sea and Roads are available from Fernleaf on (0474) 359037.
- General Map Reading, Coastal Map Reading and Geomapping, £27 each, for the BBC B and Master, from Soft Teach Educational on (0985) 40329.
- Introducing Map Skills 1 & 2, £27 each, for the BBC, from AVP on (0291) 625439.
- Maps and Landscapes 1 & 2, £22, for the BBC and A3000, from Chalksoft on (0775) 769518.
- Viewpoints, £35, for the Archimedes range, and Mapventure, £25, for the BBC and Archimedes. Contact Sherston Software on (0666) 840433.
- Shops and Supermarket, £14 for the BBC and £16 for the Compact, and Camping, £14 for the BBC, £16 for the Compact and £16 for the Archimedes. For more information contact Northern Micromedia on (091) 2700424.
- The Dudley Programs are from Heinneman Education, 22 Bedford Square, London WC1B.
- Designer Environment is available from Data Designs, Business and Innovation Centre, Innovation Way, Barnsley, S75 1JL. Prices start at £19.95 for the BBC plus £24.95 for the printware Rom, and £60 for the Archimedes.

(All prices are excluding VAT)

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Program	Page	BBC B B+	B+/ 128	Master 128	Master Compact	Electron	6502SP/ Turbo	ADFS	Econet	Shadow Ram	Archimedes/ A3000/A5000	Monthly disc
★Info	57											
Info 1-2		■	■	■	■	■	■	■	■	■		■
Info 3-4		■	■	■	■	■	■	■	■	■		■
Info 5		■	■	■	■	■	■	■	■	■	■	■
Info 6								■	■		■	■
Info 7		■	■	■	■	■	■	■	■	■	■	■
Info 8								■	■		■	■
Pieces of 8	71											
Po81-4		■	■	■	■	■	■	■	■	■		■
Po85		■	■	■	■	■	■	■	■	■		■
Po86		■	■	■	■	■	■	■	■	■		■
Po87		■	■	■	■	■	■	■	■	■		■
Sprite Editor	80								■	■		■■
Life	83	■	■	■	■	■	■	■	■	■		■

★Info

Listing 1

```
   10 REM >ThinText (Info1)
   20 REM by Martyn Ayshford
   30 REM for all 8 bit machines
   40 REM (c) BAU January 1992
   50 :
   60 DIM code &200
   70 PROCassemble
   80 FOR mode=0 TO 2
   90 MODE mode
  100 width=80/(2^mode)
  110 PRINTTAB((width-17/2)/2,0);FNthin(
"Thin text routine")
  120 FOR col=0 TO 15
  130 COLOUR col MOD 8
  140 PRINTTAB((width/20)*((col MOD 8)-4
)+(width-22/2)/2,col+2);FNthin("Printed
in any colour.")
  150 NEXT
  160 IF mode<>2 a=GET
  170 NEXT
  180 END
  190 :
  200 DEF FNthin($string)
  210 CALL thin
  220 =""
  230 :
  240 DEF PROCassemble
  250 char1=&70
  260 char2=&79
  270 byte=&82
  280 shift1=&83
  290 shift2=&84
  300 temp=&85
  310 oswrch=&FFEE
  320 osword=&FFF1
  330 FOR pass=0 TO 2 STEP 2
  340 P%=code
  350 [OPT pass
  360 .thin
  370 LDX #0
  380 .control
  390 LDA string,X
  400 CMP #32
  410 BCC end
  420 STA char2
  430 INX
  440 LDA string,X
  450 CMP #32
  460 BCC set
  470 STA char1
  480 .return
  490 INX
  500 TXA
  510 PHA
  520 LDA #10
  530 LDX #char1 MOD 256
  540 LDY #char1 DIV 256
  550 JSR osword
  560 LDX #char2 MOD 256
  570 LDY #char2 DIV 256
  580 JSR osword
  590 LDA #23
  600 JSR oswrch
  610 LDA #224
  620 JSR oswrch
  630 LDY #0
  640 .loop
  650 LDA #0
  660 STA byte
  670 LDA #1
  680 STA shift1
  690 STA shift2
  700 LDA char1+1,Y
  710 JSR once
  720 LDA #1
  730 STA shift2
  740 LDA char2+1,Y
  750 JSR once
  760 LDA byte
  770 JSR oswrch
  780 INY
  790 CPY #8
  800 BNE loop
  810 LDA #224
  820 JSR oswrch
  830 PLA
  840 TAX
  850 JMP control
  860 .end
  870 RTS
  880 .set
  890 LDA #32
  900 STA char1
  910 INX
  920 LDA #13
  930 STA string,X
  940 DEX
  950 JMP return
  960 .roll
  970 LDA byte
  980 ADC shift1
  990 STA byte
 1000 JMP ret1
 1010 .once
 1020 AND #85
 1030 STA temp
 1040 LDX #4
 1050 .back
 1060 LDA temp
 1070 AND shift2
 1080 BNE roll
 1090 .ret1
 1100 ASL shift1
 1110 ASL shift2
 1120 ASL shift2
 1130 DEX
 1140 BNE back
 1150 RTS
 1160 .string
 1170 ]
 1180 NEXT
 1190 ENDPROC
```

Listing 2

```
   10 REM >PropText (Info2)
   20 REM Proportionally spaced text
   30 REM by Dave Acton
   40 REM for all 8 bit machines
   50 REM (c) BAU January 1992
   60 :
   70 MODE 4
   80 VDU 19,0,1,0,0,0
   90 PROCass
  100 CALL buildtable
  110 VDU 5
  120 PROCprop(4,"This is an example of"
)
  130 PROCprop(7,"proportionally spaced
text.")
  140 PROCprop(13,"As you can see, many
more than 40 columns")
  150 PROCprop(16,"can be squeezed onto
a 40 column screen.")
  160 PROCprop(22,"(It looks prettier to
o!)")
  170 VDU 4
  180 END
  190 :
  200 DEF PROCprop(ypos%,t$)
  210 $word%=t$
  220 CALL length
  230 MOVE 640-(?&70+256*?&71)*2,1023-32
*ypos%
  240 CALL prop
  250 ENDPROC
  260 :
  270 DEF PROCass
  280 DIM code% &100
  290 DIM left% &100,right% &100
  300 DIM width% &100,word% &100
  310 osword=&FFF1
  320 oswrch=&FFEE
  330 FOR pass%=0 TO 2 STEP 2
  340 P%=code%
  350 [OPT pass%
  360 .length
  370 LDY #0
  380 STY &70
  390 STY &71
  400 .findlength
  410 LDX word%,Y
  420 CPX #32
  430 BCC foundlength
  440 LDA width%,X
  450 CLC
  460 ADC &70
  470 STA &70
  480 BCC nh
  490 INC &71
  500 .nh
  510 INY
  520 BNE findlength
  530 .foundlength
  540 RTS
  550 :
  560 .prop
  570 LDY #0
  580 .showprop
  590 LDX word%,Y
  600 CPX #32
  610 BCC shown
  620 LDA left%,X
  630 CLC
  640 ADC #1
  650 JSR move
  660 LDA word%,Y
  670 JSR oswrch
  680 LDA right%,X
  690 JSR move
  700 INY
  710 BNE showprop
  720 .shown
  730 RTS
  740 :
  750 .move
  760 ASL A
  770 ASL A
  780 STA &82
  790 LDA #4
  800 SEC
  810 SBC &82
  820 STA &82
  830 LDA #0
  840 SBC #0
  850 PHA
  860 LDA #25
  870 JSR oswrch
  880 LDA #0
  890 JSR oswrch
  900 LDA &82
  910 JSR oswrch
  920 PLA
  930 JSR oswrch
  940 LDA #0
  950 JSR oswrch
  960 JMP oswrch
  970 :
  980 .buildtable
  990 LDA #0
 1000 STA word%
 1010 .buildloop
 1020 LDA #10
 1030 LDX #word% MOD 256
 1040 LDY #word% DIV 256
 1050 JSR osword
 1060 LDA #&0A \ opcode for ASL A
 1070 JSR findlimit
 1080 STA left%,X
 1090 LDA #&4A \ opcode for LSR A
 1100 JSR findlimit
 1110 STA right%,X
 1120 LDA #9
 1130 SEC
 1140 SBC &80
 1150 SBC left%,X
 1160 STA width%,X
 1170 DEC word%
 1180 BNE buildloop
 1190 RTS
 1200 :
 1210 .findlimit
 1220 STA findlimitloop2+1
 1230 LDY #8
 1240 STY &80
 1250 .findlimitloop1
 1260 LDX #1
 1270 LDA word%,Y
 1280 .findlimitloop2
 1290 INX
 1300 ASL A \ modified
 1310 BEQ foundlimit
 1320 BCC findlimitloop2
 1330 TXA
 1340 SBC #2
 1350 TAX
 1360 .foundlimit
 1370 CPX &80
 1380 BCS xnotless
 1390 STX &80
 1400 .xnotless
 1410 DEY
 1420 BNE findlimitloop1
 1430 LDX word%
 1440 LDA &80
 1450 RTS
 1460 ]
 1470 NEXT pass%
 1480 ENDPROC
```

Listing 3

```
   10 REM >BlindFlies (Info3)
   20 REM By Barry Wickett
   30 REM For Archimedes only
   40 REM (C) BAU January 1992
   50 :
   60 MODE 12:MODE 8:OFF
   70 ON ERROR PROCerror
   80 PROCinit:PROCflies
   90 END
  100 :
  110 DEF PROCerror
  120 IF ERR=17 MODE 0:END
  130 SYS"OS_Byte",112,3-screen
  140 SYS"OS_Byte",113,3-screen
  150 PRINTREPORT$;" at line ";ERL
  160 END
  170 :
  180 DEF PROCinit
  190 COLOUR 2,4:ORIGIN 640,512
  200 goodies=3:baddies=1
  210 size=32:speed=8
  220 flies=goodies+baddies
  230 DIM sx(flies),sy(flies),an(flies),
hx(flies),hy(flies)
  240 DIM search(flies),honk(flies)
  250 min=10:max=200:honk=max
  260 FOR fly=1 TO flies
  270 sx(fly)=RND(800)-400
  280 sy(fly)=RND(800)-400
  290 an(fly)=RND(360)-1
  300 search(fly)=FALSE
  310 honk(fly)=honk
  320 IF fly=goodies honk=honk/2
  330 NEXT fly
  340 screen=1
  350 ENDPROC
  360 :
  370 DEF PROCflies
  380 REPEAT
  390 SYS "OS_Byte",113,screen
  400 WAIT
  410 screen=3-screen
  420 SYS "OS_Byte",112,screen
```

```
430 CLS
440 FOR fly=1 TO flies
450 IF search(fly) THEN
460 dx=hx(fly)-sx(fly)
470 dy=hy(fly)-sy(fly)
480 IF dx=0 ang=90*SGN(dy) ELSE ang=DEGATN(dy/dx)+(dx<0)*180
490 ang=FNnorm(FNnorm(ang)-an(fly))/10
500 an(fly)+=ang
510 honk(fly)=SQR(dx*dx+dy*dy)/2
520 IF honk(fly)>max honk(fly)=max
530 IF honk(fly)<min honk(fly)=min
540 ENDIF
550 an(fly)=FNnorm(an(fly))
560 IF fly>goodies GCOL 0,2 ELSE GCOL 0,1
570 ix=COSRAD(an(fly))*speed
580 iy=SINRAD(an(fly))*speed
590 IF search(fly)=-2 ix=2*ix:iy=2*iy
600 bang=FNbang
610 IF bang>=0 an(fly)=FNnorm(180-(an(fly)-bang)+bang)
620 IF RND(honk(fly))=RND(honk(fly)) THEN
630 STEREO 1,sx(fly)/5
640 SOUND 1,-10,fly*10-50*(fly<=goodies)+50,1
650 FOR fly2=1 TO flies
660 IF fly2<>fly THEN
670 IF fly>goodies AND fly2<=goodies THEN
680 dx=sx(fly2)-sx(fly)
690 dy=sy(fly2)-sy(fly)
700 dist=SQR(dx*dx+dy*dy)
710 hx(fly2)=(dx/dist)*500
720 hy(fly2)=(dy/dist)*500
730 search(fly2)=-2
740 ELSE
750 hx(fly2)=sx(fly)
760 hy(fly2)=sy(fly)
770 search(fly2)=-1
780 ENDIF
790 ENDIF
800 NEXT fly2
810 GCOL 0,3
820 ENDIF
830 sx(fly)+=ix:sy(fly)+=iy
840 CIRCLE FILL sx(fly),sy(fly),size
850 PROCline(-30):PROCline(30)
860 NEXT fly
870 UNTIL FALSE
880 :
890 DEF FNbang
900 IF sx(fly)+ix<=size-620 THEN =180
910 IF sy(fly)+iy<=size-480 THEN =270
920 IF sx(fly)+ix>=620-size THEN =0
930 IF sy(fly)+iy>=480-size THEN =90
940 =-1
950 :
960 DEF PROCline(ang)
970 LINE sx(fly)+COSRAD(an(fly)+ang)*size*2,sy(fly)+SINRAD(an(fly)+ang)*size*2,sx(fly),sy(fly)
980 ENDPROC
990 :
1000 DEF FNnorm(a)
1010 IF a>180 THEN =a-360
1020 IF a<-180 THEN =a+360
1030 =a
```

Listing 4

```
10 REM >Plasma Clouds (Info4)
20 REM by Phil Le Sueur
30 REM for Archimedes/A3000
40 REM (c) BAU January 1992
50 :
60 ON ERROR PROCerror(TRUE)
70 PROCsetup
80 REPEAT
90 PROCgetvars
100 PROCdrawscreen:PROCcycle
110 UNTIL FALSE
120 END
130 :
140 DEF PROCerror(restart%)
150 IF restart%=TRUE AND ERR=17 THEN RUN
160 IF ERR=17 MODE 0:END
170 ON:PRINTTAB(0,30);REPORT$;" at line ";ERL
180 END
190 :
200 DEF PROCsetup
210 MODE 13
220 grain%=20
230 xw%=768:yw%=768
240 xp%=2:yp%=2
250 DIM gcol%(36),tint%(36)
260 DIM save% 320*256*4
270 DIM code% (20+320*3)*4
280 DIM switch% 256
290 DIM temp% 8
300 FOR I%=0 TO 15
310 READ b%,g%,r%
320 COLOUR I%,r%<<4,g%<<4,b%<<4
330 NEXT
340 FOR I%=0 TO 35
350 READ gcol%(I%),tint%(I%)
360 NEXT
370 ENDPROC
380 :
390 DEF PROCgetvars
400 LOCAL I%
410 LOCAL ERROR
420 ON ERROR LOCAL PROCerror(FALSE)
430 CLS:ON:C%=0
440 PROCprint("P L A S M A   C L O U D S",7,5)
450 PROCprint("Graininess (1 - 100) :",7,12)
460 PROCprint("Drawing width (Acorn units) :",0,14)
470 PROCprint("Drawing depth (Acorn units) :",0,16)
480 PROCprint("Point width (pixels) :",7,18)
490 PROCprint("Point depth (pixels) :",7,20)
500 PROCprint("By Phil Le Sueur (1991)",7,28)
510 COLOURgcol%(0) TINT tint%(0)
520 INPUTTAB(30,12)I%
530 IF I%>=1 AND I%<=100 grain%=I% ELSE PRINTTAB(30,12);grain%
540 INPUTTAB(30,14)I%
550 IF I%>=256 AND I%<=1280 xw%=I% AND &FFFFFFFC ELSE PRINTTAB(30,14);xw%
560 INPUTTAB(30,16)I%
570 IF I%>=256 AND I%<=1024 yw%=I% AND &FFFFFFFC ELSE PRINTTAB(30,16);yw%
580 INPUTTAB(30,18)I%
590 IF I%>=1 AND I%<=xw%/8 xp%=I% ELSE PRINTTAB(30,18);xp%
600 INPUTTAB(30,20)I%
610 IF I%>=1 AND I%<=yw%/8 yp%=I% ELSE PRINTTAB(30,20);yp%
620 OFF:CLS
630 xo%=(1280-xw%)/8:yo%=(1024-yw%)/8
640 xpoints%=xw%/(4*xp%):ypoints%=yw%/(4*yp%)
650 FOR I%=save% TO save%+xpoints%*ypoints%*4 STEP 4
660 !I%=0
670 NEXT
680 PROCassemble
690 RESTORE ERROR
700 ENDPROC
710 :
720 DEF PROCprint(C$,x%,y%)
730 LOCAL I%
740 PRINT TAB(x%,y%);
750 FOR I%=1 TO LEN(C$)
760 COLOUR gcol%(C% MOD 36) TINT tint%(C% MOD 36)
770 PRINT MID$(C$,I%,1);
780 C%+=1
790 NEXT
800 ENDPROC
810 :
820 DEF PROCdrawscreen
830 LOCAL x%,y%,len_x%,len_y%,t_lft%,t_ryt%,b_lft%,b_ryt%
840 x%=0:y%=0
850 len_x%=xpoints%:len_y%=ypoints%
860 t_lft%=(RND(36)-1)<<16
870 t_ryt%=(RND(36)-1)<<16
880 b_lft%=(RND(36)-1)<<16
890 b_ryt%=(RND(36)-1)<<16
900 PROCplot(x%,y%,t_lft%)
910 PROCplot(x%+len_x%-1,y%,t_ryt%)
920 PROCplot(x%,y%+len_y%-1,b_lft%)
930 PROCplot(x%+len_x%-1,y%+len_y%-1,b_ryt%)
940 PROCquarter(x%,y%,len_x%,len_y%,t_lft%,t_ryt%,b_lft%,b_ryt%,1)
950 ENDPROC
960 :
970 DEF PROCcycle
980 LOCAL c%
990 c%=0:*FX15,1
1000 REPEAT
1010 CALL start
1020 c%+=1
1030 UNTIL INKEY(0)<>-1
1040 WHILE c% MOD 33 <> 0
1050 CALL start
1060 c%+=1
1070 ENDWHILE
1080 *FX15,1
1090 ENDPROC
1100 :
1110 DEF PROCquarter(x%,y%,len_x%,len_y%,t_lft%,t_ryt%,b_lft%,b_ryt%,q%)
1120 LOCAL x_lft%,x_ryt%,y_top%,y_bot%,lx_lft%,lx_ryt%,ly_top%,ly_bot%
1130 LOCAL top%,bot%,lft%,ryt%,mid%
1140 CASE q% OF
1150 WHEN 1:
1160 PROCplot(x%+len_x%-1,y%,t_ryt%)
1170 PROCplot(x%+len_x%-1,y%+len_y%-1,b_ryt%)
1180 WHEN 2:
1190 PROCplot(x%+len_x%-1,y%+len_y%-1,b_ryt%)
1200 WHEN 3:
1210 PROCplot(x%,y%,t_lft%)
1220 WHEN 4:
1230 PROCplot(x%,y%+len_y%-1,b_lft%)
1240 ENDCASE
1250 IF len_x%<=2 AND len_y%<=2 ENDPROC
1260 IF INKEY(0) <> -1 PROCcycle
1270 x_lft%=x%:y_top%=y%
1280 lx_lft%=(len_x%+1)/2:ly_top%=(len_y%+1)/2
1290 x_ryt%=x%+lx_lft%-1:y_bot%=y%+ly_top%-1
1300 lx_ryt%=len_x%-lx_lft%+1:ly_bot%=len_y%-ly_top%+1
1310 IF x%=0 THEN
1320 IF y%=0 THEN
1330 top%=FNrand((t_lft%+t_ryt%)/2,len_x%)
1340 ELSE
1350 top%=save%!((x_ryt%*ypoints%+y_top%)*4)
1360 ENDIF
1370 lft%=FNrand((t_lft%+b_lft%)/2,len_y%)
1380 ELSE
1390 IF y%=0 THEN
1400 top%=FNrand((t_lft%+t_ryt%)/2,len_x%)
1410 ELSE
1420 top%=save%!((x_ryt%*ypoints%+y_top%)*4)
1430 ENDIF
1440 lft%=save%!((x_lft%*ypoints%+y_bot%)*4)
1450 ENDIF
1460 ryt%=FNrand((t_ryt%+b_ryt%)/2,len_y%)
1470 bot%=FNrand((b_lft%+b_ryt%)/2,len_x%)
1480 mid%=(top%+bot%+lft%+ryt%)/4
1490 IF (top% >> 16)>35 STOP
1500 IF (bot% >> 16)>35 STOP
1510 IF (lft% >> 16)>35 STOP
1520 IF (ryt% >> 16)>35 STOP
1530 IF len_x%<=2 THEN
1540 PROCquarter(x%,y_top%,len_x%,ly_top%,t_lft%,t_ryt%,lft%,ryt%,1)
1550 PROCquarter(x%,y_bot%,len_x%,ly_bot%,lft%,ryt%,b_lft%,b_ryt%,3)
1560 ELSE
1570 IF len_y%<=2 THEN
1580 PROCquarter(x_lft%,y%,lx_lft%,len_y%,t_lft%,top%,b_lft%,bot%,1)
1590 PROCquarter(x_ryt%,y%,lx_ryt%,len_y%,top%,t_ryt%,bot%,b_ryt%,5)
1600 ELSE
1610 PROCquarter(x_lft%,y_top%,lx_lft%,ly_top%,t_lft%,top%,lft%,mid%,1)
1620 PROCquarter(x_ryt%,y_top%,lx_ryt%,ly_top%,top%,t_ryt%,mid%,ryt%,2)
1630 PROCquarter(x_lft%,y_bot%,lx_lft%,ly_bot%,lft%,mid%,b_lft%,bot%,3)
1640 PROCquarter(x_ryt%,y_bot%,lx_ryt%,ly_bot%,mid%,ryt%,bot%,b_ryt%,4)
1650 ENDIF
1660 ENDIF
1670 ENDPROC
1680 :
1690 DEF PROCplot(x%,y%,c%)
1700 IF save%!((x%*ypoints%+y%)*4)=c% ENDPROC
1710 save%!((x%*ypoints%+y%)*4)=c%
1720 GCOL gcol%(c%>>16) TINT tint%(c%>>16)
1730 RECTANGLE FILL(xo%+x%*xp%)*4,1024-(yo%+(y%+1)*yp%)*4,(xp%-1)*4,(yp%-1)*4
1740 ENDPROC
1750 :
1760 DEF FNrand(c%,l%)
1770 LOCAL new%,change%
1780 change%=(l%/2-RND(l%))*grain%/20
1790 change%=((ABS(change%) MOD 18) << 16) * SGN(change%)
1800 IF (c%+change%<0 OR c%+change%>=(36 << 16)) THEN
1810 new%=c%-change%
1820 ELSE
1830 new%=c%+change%
1840 ENDIF
1850 =new%
1860 :
1870 DEF FNmemval(colour%)
1880 LOCAL gcol%,tint%,memval%
1890 memval%=0
1900 colour%=colour% MOD 36
1910 gcol%=gcol%(colour%):tint%=tint%(colour%)
1920 memval%=memval% OR (tint%>>6)
1930 memval%=memval% OR ((gcol% AND 1) << 2)
1940 memval%=memval% OR ((gcol% AND (1 << 4)) >> 1)
1950 memval%=memval% OR ((gcol% AND (1 << 1)) << 3)
1960 memval%=memval% OR ((gcol% AND (3 << 2)) << 3)
1970 memval%=memval% OR ((gcol% AND (1 << 5)) << 2)
1980 =memval%
1990 :
2000 DEF PROCassemble
2010 FOR pass%=0 TO 2 STEP 2
2020 P%=code%
2030 [ OPT pass%
2040 .scrstart
2050 EQUD    FNscreenadr+320*yo%+xo%
2060 .scrlines
2070 EQUD    (yw%/4)-1
2080 .switchadr
2090 EQUD     switch%
2100 :
2110 .start  LDR     r0,scrstart
2120 LDR     r1,scrlines
2130 LDR     r2,switchadr
2140 MOV     r3,#0
2150 .loop   FNxlate(xw%/4)
2160 ADD     r0,r0,#(320-xw%/4)
2170 SUBS    r1,r1,#1
2180 BPL     loop
2190 MOVS    pc,r14
2200 ]
2210 NEXT
2220 FOR I%=0 TO 255
2230 switch%?I%=I%
2240 NEXT
2250 FOR I%=0 TO 34
2260 switch%?(FNmemval(I%))=FNmemval(I%+1)
2270 NEXT
2280 ENDPROC
2290 :
2300 DEF FNxlate(bytes%)
2310 LOCAL I%
2320 FOR I%=1 TO bytes%
2330 [OPT pass%
2340 LDRB     r3,[r0]
2350 LDRB     r3,[r2,r3]
2360 STRB     r3,[r0],#1
2370 ]
2380 NEXT
2390 =pass%
2400 :
2410 DEF FNscreenadr
2420 temp%!0=148:temp%!4=-1
2430 SYS"OS_ReadVduVariables",temp%,temp%
2440 =!temp%
2450 :
2460 DATA  0,0,0, 0,0,7, 0,2,5, 0,3,4
2470 DATA  0,0,3, 0,1,2, 0,3,0, 2,1,0
2480 DATA  3,0,0, 4,3,0, 5,2,0, 7,0,0
2490 DATA  5,0,2, 4,0,3, 3,0,4, 2,0,5
2500 :
2510 DATA  2, 64,  2,128,  2,192,  7, 0
2520 DATA  7, 64,  7,128,  8, 64,  8,128
2530 DATA  8,192, 13,  0, 13, 64, 13,128
2540 DATA 13,128, 13,192, 28,  0, 24, 64
2550 DATA 24,128, 24,192, 37,128, 37,192
2560 DATA 52,  0, 48, 64, 48,128, 48,192
2570 DATA 48,192, 49,  0, 49, 64, 49,128
2580 DATA 49,192, 32, 64, 18,192, 19, 0
2590 DATA 19, 64, 19,128, 19,192,  2, 64
```

Listing 5

```
10 REM >Mindmaster (Info5)
20 REM by J A McHugh
30 REM for all machines
40 REM (c) BAU January 1992
50 :
60 ON ERROR IF ERR=17 MODE7:END ELSE REPORT:PRINT" at line ";:ERL:END
70 MODE 7
80 PROCc(0)
90 DIM col$(4),in$(4),mark(4,2),used(7)
100 REPEAT
110 PROCscreen
120 PROCinit
130 REPEAT
140 PROCguess
150 right=FNmark
160 UNTIL guess=8 OR right=4
170 IF right=4 PROCtwice(5,20,sol$+" - WELL DONE!  ") ELSE PROCtwice(5,20,sol$+" - BAD LUCK    ")
180 PRINTTAB(12,23);CHR$135;"ANOTHER GAME ? ";
190 finished=NOTFNyorn
200 UNTIL finished
210 MODE 7
220 END
230 :
240 DEF PROCinit
250 PROCtwice(8,20,CHR$135+"ALLOW DOUBLE COLOURS ?")
260 doubles=FNyorn:guess=0
270 cols$="RGYBMCW"
280 ans$="":sol$=""
290 FOR i=1 TO 7
300 used(i)=FALSE
310 NEXT
320 FOR i=1 TO 4
330 REPEAT
340 col=RND(7)
350 UNTIL NOT used(col)
360 used(col)=NOT doubles
370 col$(i)=MID$(cols$,col,1)
380 ans$=ans$+col$(i)
390 sol$=sol$+CHR$(144+col)+CHR$175+CHR$175
400 NEXT
410 sol$=sol$+CHR$156+CHR$135
420 sel$=CHR$135+"SELECT FOUR : "
430 FOR i=1 TO LEN(cols$)
440 sel$=sel$+CHR$(128+i)+MID$(cols$,i,1)
450 NEXT
460 ENDPROC
470 :
480 DEF FNyorn
490 PROCc(1):REPEAT
500 k=INSTR(" YyNn",GET$) DIV 2
510 UNTIL k>0
520 PROCc(0)
530 =(k=1)
540 :
550 DEF PROCc(s)
560 VDU 23;10,255-159*s;0;0;0;0;
570 ENDPROC
580 :
590 DEF PROCscreen
600 VDU 12,132,157,135
610 FOR i=1 TO 22
620 VDU 31,0,i,132,157,32,156,31,37,i,132,157
630 NEXT
640 VDU 31,3,18,132,157,31,0,23,132,157
650 VDU 31,9,0:PRINT"INPUT";SPC13;"REPLY"
```

```
 660 FOR i=1 TO 17:VDU 31,4,i,141:NEXT
 670 FOR i=1 TO 17:VDU 31,19,i,132,157,156:NEXT
 680 FOR i=20 TO 21:VDU 31,4,i,141:NEXT
 690 ENDPROC
 700 :
 710 DEF PROCtwice(x,y,str$)
 720 PRINTTAB(x,y);str$;TAB(x,y+1);str$;
 730 ENDPROC
 740 :
 750 DEF PROCguess
 760 guess=guess+1
 770 PROCtwice(5,20,sel$)
 780 *FX 21,1
 790 peg=1
 800 done=FALSE
 810 REPEAT
 820 PROCc(1)
 830 VDU 31,peg*3+3,guess*2
 840 key$=GET$
 850 PROCc(0)
 860 IF key$=CHR$127 AND peg<>1 peg=peg-1:PROCpeg(peg*3+2,guess,0)
 870 IF key$=CHR$13 AND peg=5 done=TRUE
 880 col=INSTR(cols$,key$)
 890 IF col>0 AND peg<5 PROCpeg(peg*3+2,guess,col):in$(peg)=key$:peg=peg+1
 900 UNTIL done
 910 ENDPROC
 920 :
 930 DEF FNmark
 940 FOR i=1 TO 4
 950 mark(i,1)=0:mark(i,2)=0
 960 NEXT
 970 markx=23:n=0
 980 FOR i=1 TO 4
 990 IF in$(i)=col$(i) PROCdo(i,i,4):n=n+1
1000 NEXT
1010 FOR i=1 TO 4
1020 FOR j=1 TO 4
1030 IF i<>j AND in$(i)=col$(j) PROCdo(i,j,7)
1040 NEXT
1050 NEXT
1060 =n
1070 :
1080 DEF PROCdo(peg1,peg2,c)
1090 IF mark(peg1,1)=1 OR mark(peg2,2)=1 ENDPROC
1100 mark(peg1,1)=1
1110 mark(peg2,2)=1
1120 PROCpeg(markx,guess,c)
1130 markx=markx+3
1140 ENDPROC
1150 :
1160 DEF PROCpeg(x,y,c)
1170 VDU 31,x,y*2-1
1180 IF c=0 VDU 32,32,32,8,8,8,10,32,32,32 ELSE VDU 144+c,124,124,8,8,8,10,144+c,124,124
1190 ENDPROC
```

Listing 6

```
  10 REM >ARMTree (Info6)
  20 REM by Daniel Tray
  30 REM for Archimedes only
  40 REM (c) BAU January 1992
  50 :
  60 MODE 15:MODE 12:OFF
  70 ON ERROR MODE 0:IF ERR=17 AND INKEY-1 END ELSE IF ERR=17 RUN ELSE PRINTREPORT$;" at line ";ERL:END
  80 DIM stack% 4095,sins 360*4,coss 360*4,code% &400
  90 PROCcode
 100 PROCinit
 110 PROCdrawtree
 120 PROCswap
 130 REPEAT
 140 REPEAT
 150 MOUSE mx,my,mz
 160 mx=mx DIV 16
 170 my=31-(my DIV 32)
 180 add=((mx=64)-(mx=79))*mz
 190 opt=((my DIV 2)+1)*(my<=20)*((my MOD 2)=0)
 200 UNTIL add<>0 AND opt<>0
 210 CASE opt OF
 220 WHEN  1:PROCchange(!alpha,0,360,-add,TRUE)
 230 WHEN  2:PROCchange(!beta,0,360,-add,TRUE)
 240 WHEN  3:PROCchange(!gamma,0,360,-add,TRUE)
 250 WHEN  4:PROCchange(!base,0,360,-add,TRUE)
 260 WHEN  5:PROCchange(!xpos,20,1004,4*add,FALSE)
 270 WHEN  6:PROCchange(!ypos,20,1004,4*add,FALSE)
 280 WHEN  7:PROCchange(!mainlen,0,800,4*add,FALSE)
 290 WHEN  8:PROCchange(!maxdepth,1,7,SGNadd,FALSE)
 300 WHEN  9:PROCchange(lscale,0,1,add*0.01,FALSE)
 310 WHEN 10:PROCchange(cscale,0,1,add*0.01,FALSE)
 320 WHEN 11:PROCchange(rscale,0,1,add*0.01,FALSE)
 330 ENDCASE
 340 PROCdrawtree
 350 PROCswap
 360 UNTIL FALSE
 370 :
 380 DEF PROCchange(RETURN var,min,max,add,wrap)
 390 var+=add
 400 IF wrap THEN
 410 IF var<min var+=(max-min)
 420 IF var>max var-=(max-min)
 430 ELSE
 440 IF var<min var=min
 450 IF var>max var=max
 460 ENDIF
 470 ENDPROC
 480 :
 490 DEF PROCscreen
 500 COLOUR 10,96,64,48
 510 COLOUR 11,80,48,32
 520 PROCbox("Alpha",0,1)
 530 PROCbox("Beta",2,1)
 540 PROCbox("Gamma",4,1)
 550 PROCbox("Base angle",6,1)
 560 PROCbox("X position",8,1)
 570 PROCbox("Y position",10,2)
 580 PROCbox("Main length",12,2)
 590 PROCbox("Max depth",14,2)
 600 PROCbox("Left scale",16,2)
 610 PROCbox("Centre scale",18,2)
 620 PROCbox("Right scale",20,2)
 630 MOUSE ON
 640 MOUSE TO 1152,512
 650 *POINTER 1
 660 MOUSE RECTANGLE 1024,0,255,1023
 670 ENDPROC
 680 :
 690 DEF PROCbox(text$,y,arrows)
 700 IF arrows THEN
 710 VDU 31,64,y,arrows*2+134
 720 VDU 31,79,y,arrows*2+135
 730 ENDIF
 740 VDU 5
 750 MOVE 1024+(256-(LENtext$)*16)/2,1023-(y*32)
 760 PRINT text$
 770 VDU 4
 780 ENDPROC
 790 :
 800 DEF PROCinit
 810 SYS "OS_Byte",113,1
 820 SYS "OS_Byte",112,2
 830 PROCscreen
 840 SYS "OS_Byte",112,1
 850 PROCscreen
 860 bank%=1
 870 !alpha=30
 880 !beta=330
 890 !gamma=0
 900 !base=90
 910 !xpos=512
 920 !ypos=64
 930 !mainlen=200
 940 !maxdepth=7
 950 lscale=0.6
 960 cscale=0.65
 970 rscale=0.6
 980 ENDPROC
 990 :
1000 DEF PROCdrawtree
1010 VDU 24,16;16;1007;1007;
1020 SYS "OS_Byte",113,bank%
1030 SYS "OS_Byte",112,bank% EOR 3
1040 !lsf=lscale*65536
1050 !csf=cscale*65536
1060 !rsf=rscale*65536
1070 !ca=coss!(!alpha*4)
1080 !sa=sins!(!alpha*4)
1090 !cb=coss!(!beta*4)
1100 !sb=sins!(!beta*4)
1110 !cg=coss!(!gamma*4)
1120 !sg=sins!(!gamma*4)
1130 A%=!base
1140 B%=!xpos
1150 C%=!ypos
1160 D%=!mainlen
1170 E%=0
1180 F%=coss
1190 G%=sins
1200 CALL tree
1210 VDU 24,0;0;1279;1023;
1220 ENDPROC
1230 :
1240 DEF PROCswap
1250 VDU 24,16;16;1007;1007;
1260 WAIT
1270 SYS "OS_Byte",113,bank% EOR 3
1280 SYS "OS_Byte",112,bank%
1290 CLG
1300 bank%=bank% EOR 3
1310 VDU 24,0;0;1279;1023;
1320 ENDPROC
1330 :
1340 DEF PROCcode
1350 theta=0
1360 x=1
1370 y=2
1380 l=3
1390 depth=4
1400 cos_ptr=5
1410 sin_ptr=6
1420 stack=7
1430 vp=8
1440 index=3
1450 t1=9
1460 t2=10
1470 t3=11
1480 t4=4
1490 :
1500 FOR pass%=0 TO 2 STEP 2
1510 P%=code%
1520 [OPT pass%
1530 .vars
1540 .alpha          EQUD 0 \ +0
1550 .beta           EQUD 0 \ +4
1560 .gamma          EQUD 0 \ +8
1570 .base           EQUD 0 \ +12
1580 .xpos           EQUD 0 \ +16
1590 .ypos           EQUD 0 \ +20
1600 .mainlen        EQUD 0 \ +24
1610 .maxdepth       EQUD 0 \ +28
1620 .lsf            EQUD 0 \ +32
1630 .csf            EQUD 0 \ +36
1640 .rsf            EQUD 0 \ +40
1650 .stackad        EQUD stack% \ +44
1660 .ca             EQUD 0 \ +48
1670 .sa             EQUD 0 \ +52
1680 .cb             EQUD 0 \ +56
1690 .sb             EQUD 0 \ +60
1700 .cg             EQUD 0 \ +64
1710 .sg             EQUD 0 \ +68
1720 .p              EQUD 0 \ +72
1730 .q              EQUD 0 \ +76
1740 .c              EQUD 0 \ +80
1750 .s              EQUD 0 \ +84
1760 :
1770 .tree   STMFD   R13!,{R0-R4,R14}
1780 ADR     vp,vars
1790 LDR     t1,[vp,#28]
1800 CMP     t1,depth
1810 LDMEQFD R13!,{R0-R4,PC}
1820 LDR     stack,[vp,#44]
1830 MOV     t1,#56
1840 MUL     t2,t1,depth
1850 ADD     stack,stack,t2
1860 STR     theta,[stack]
1870 LDR     t1,[vp,#32]
1880 MUL     t2,t1,l
1890 MOV     t2,t2,ASR #16
1900 STR     t2,[stack,#4]
1910 LDR     t1,[vp,#36]
1920 MUL     t2,t1,l
1930 MOV     t2,t2,ASR #16
1940 STR     t2,[stack,#8]
1950 LDR     t1,[vp,#40]
1960 MUL     t2,t1,l
1970 MOV     t2,t2,ASR #16
1980 STR     t2,[stack,#12]
1990 MOV     t1,#0
2000 STR     t1,[stack,#16]
2010 STR     t1,[stack,#20]
2020 STR     t1,[stack,#28]
2030 STR     l,[stack,#24]
2040 LDR     t1,[stack,#8]
2050 LDR     t2,[vp,#64]
2060 MUL     t3,t1,t2
2070 MOV     t3,t3,ASR #16
2080 ADD     t3,t3,l
2090 STR     t3,[stack,#32]
2100 LDR     t2,[vp,#68]
2110 MUL     t3,t1,t2
2120 MOV     t3,t3,ASR #16
2130 STR     t3,[stack,#36]
2140 LDR     t1,[stack,#4]
2150 LDR     t2,[vp,#48]
2160 MUL     t3,t1,t2
2170 MOV     t3,t3,ASR #16
2180 ADD     t3,t3,l
2190 STR     t3,[stack,#40]
2200 LDR     t2,[vp,#52]
2210 MUL     t3,t1,t2
2220 MOV     t3,t3,ASR #16
2230 STR     t3,[stack,#44]
2240 LDR     t1,[stack,#12]
2250 LDR     t2,[vp,#56]
2260 MUL     t3,t1,t2
2270 MOV     t3,t3,ASR #16
2280 ADD     t3,t3,l
2290 STR     t3,[stack,#48]
2300 LDR     t2,[vp,#60]
2310 MUL     t3,t1,t2
2320 MOV     t3,t3,ASR #16
2330 STR     t3,[stack,#52]
2340 STMFD   R13!,{R3,R4}
2350 MOV     index,#16
2360 MOV     t2,theta,ASL #2
2370 LDR     t1,[cos_ptr,t2]
2380 STR     t1,[vp,#80]
2390 LDR     t1,[sin_ptr,t2]
2400 STR     t1,[vp,#84]
2410 .transform_loop
2420 LDR     t1,[stack,index]
2430 STR     t1,[vp,#72]
2440 ADD     index,index,#4
2450 LDR     t1,[stack,index]
2460 SUB     index,index,#4
2470 STR     t1,[vp,#76]
2480 LDR     t1,[vp,#72]
2490 LDR     t2,[vp,#80]
2500 MUL     t3,t1,t2
2510 MOV     t4,t3,ASR #16
2520 LDR     t1,[vp,#76]
2530 LDR     t2,[vp,#84]
2540 MUL     t3,t1,t2
2550 SUB     t4,t4,t3,ASR #16
2560 ADD     t4,t4,x
2570 STR     t4,[stack,index]
2580 ADD     index,index,#4
2590 LDR     t1,[vp,#72]
2600 LDR     t2,[vp,#84]
2610 MUL     t3,t1,t2
2620 MOV     t4,t3,ASR #16
2630 LDR     t1,[vp,#76]
2640 LDR     t2,[vp,#80]
2650 MUL     t3,t1,t2
2660 ADD     t4,t4,t3,ASR #16
2670 ADD     t4,t4,y
2680 STR     t4,[stack,index]
2690 ADD     index,index,#4
2700 CMP     index,#56
2710 BNE     transform_loop
2720 LDMFD   R13!,{R3,R4}
2730 SWI     256+18
2740 SWI     256+0
2750 CMP     depth,#5
2760 SWILT   256+10
2770 SWIEQ   256+2
2780 SWIGT   256+3
2790 MOV     R0,#4
2800 LDR     R1,[stack,#16]
2810 LDR     R2,[stack,#20]
2820 SWI     "OS_Plot"
2830 MOV     R0,#5
2840 LDR     R1,[stack,#24]
2850 LDR     R2,[stack,#28]
2860 SWI     "OS_Plot"
2870 MOV     R0,#5
2880 LDR     R1,[stack,#32]
2890 LDR     R2,[stack,#36]
2900 SWI     "OS_Plot"
2910 MOV     R0,#4
2920 LDR     R1,[stack,#40]
2930 LDR     R2,[stack,#44]
2940 SWI     "OS_Plot"
2950 MOV     R0,#5
2960 LDR     R1,[stack,#24]
2970 LDR     R2,[stack,#28]
2980 SWI     "OS_Plot"
2990 MOV     R0,#5
3000 LDR     R1,[stack,#48]
3010 LDR     R2,[stack,#52]
3020 SWI     "OS_Plot"
3030 LDR     t1,[stack]
3040 LDR     t2,[vp]
3050 ADD     R0,t1,t2
3060 CMP     R0,#360
3070 SUBGE   R0,R0,#360
3080 LDR     R1,[stack,#40]
3090 LDR     R2,[stack,#44]
3100 LDR     R3,[stack,#4]
3110 ADD     depth,depth,#1
3120 BL      tree
3130 SUB     depth,depth,#1
3140 MOV     t1,#56
3150 MUL     t2,t1,depth
3160 LDR     stack,[vp,#44]
3170 ADD     stack,stack,t2
3180 LDR     t1,[stack]
3190 LDR     t2,[vp,#8]
3200 ADD     R0,t1,t2
3210 CMP     R0,#360
3220 SUBGE   R0,R0,#360
3230 LDR     R1,[stack,#32]
3240 LDR     R2,[stack,#36]
3250 LDR     R3,[stack,#8]
3260 ADD     depth,depth,#1
3270 BL      tree
3280 SUB     depth,depth,#1
3290 MOV     t1,#56
3300 MUL     t2,t1,depth
3310 LDR     stack,[vp,#44]
3320 ADD     stack,stack,t2
3330 LDR     t1,[stack]
3340 LDR     t2,[vp,#4]
3350 ADD     R0,t1,t2
3360 CMP     R0,#360
3370 SUBGE   R0,R0,#360
3380 LDR     R1,[stack,#48]
3390 LDR     R2,[stack,#52]
3400 LDR     R3,[stack,#12]
3410 ADD     depth,depth,#1
3420 BL      tree
3430 SUB     depth,depth,#1
3440 LDMFD   R13!,{R0-R4,PC}
3450 ]
3460 NEXT pass%
3470 FOR I%=0 TO 359
3480 sins!(I%*4)=(SIN(RAD(I%)))*65536
3490 coss!(I%*4)=(COS(RAD(I%)))*65536
3500 NEXT
3510 ENDPROC
```

Listing 7

```
  10 REM >Snowflake (Info7)
  20 REM by John Knowles
  30 REM for all machines
  40 REM (c) BAU January 1992
  50 :
  60 MODE 0
  70 INPUT "Number of points :"a%
  80 INPUT "Divide by :"b
  90 VDU 12,23;10,255;0;0;0;
 100 DIM x%(a%),y%(a%)
 110 cdiv=2*PI/a%
 120 cx%=640:cy%=512:s%=512
 130 FOR i=1 TO a%
 140 t=cdiv*(i-1)
 150 x%(i)=cx%+s%*COS t
 160 y%(i)=cy%+s%*SIN t
 170 PLOT 69,x%(i),y%(i)
 180 NEXT
 190 x%=x%(1):y%=y%(1)
 200 FOR i%=1 TO 50000
 210 r=RND(a%)
 220 x%=x%+(x%(r)-x%)/b
 230 y%=y%+(y%(r)-y%)/b
 240 PLOT 69,x%,y%
 250 NEXT
 260 END
```

Listing 8

```
  10 REM >DTsrc - Module task demonstration (Info8)
  20 REM By David Lawrence
  30 REM For Archimedes only
  40 REM (C) BAU January 1992
  50 :
  60 DIM code% 1000
  70 wp=12
  80 sp=13
```




```
90 link=14
100 pc=15
110 :
120 taskhandle=256
130 FOR I%=4 TO 6 STEP 2:P%=0:O%=code%
140 [OPT I%
150 EQUD StartCode
160 EQUD InitCode
170 EQUD FinalCode
180 EQUD ServiceCode
190 EQUD TitleString
200 EQUD HelpString
210 EQUD HelpTable
220 EQUD 0    \ SWI chunk number
230 EQUD 0    \ SWI handler
240 EQUD 0    \ SWI decode table
250 EQUD 0    \ SWI decode code
260 .TitleString
270 EQUS "DoubleTake"
280 EQUB 0
290 ALIGN
300 .HelpString
310 EQUS "Double Take"
320 EQUB 9
330 EQUS "1.00 (07 Oct 1991) Dave Lawrence"
340 EQUB 0
350 ALIGN
360 .HelpTable
370 EQUS "Desktop_DoubleTake"
380 EQUB 0
390 ALIGN
400 EQUD StarCommand
410 EQUD 0
420 EQUD 0
430 EQUD help
440 EQUB 0
450 .help   EQUS "Double clicking and holding the second click will open "
460 EQUS "application directories (same as holding down Shift) or "
470 EQUS "send any file to !Edit (if loaded)."
480 EQUB 13
490 EQUS "Do not use *Desktop_DoubleTake, use *Desktop instead."
500 EQUB 0
510 ALIGN
520 .InitCode
530 STMFD   (sp)!,{R7-R11,link}
540 MOV     R0,#6
550 MOV     R3,#300
560 SWI     "XOS_Module"
570 BVS     InitExit
580 STR     R2,[wp]
590 MOV     R0,#0
600 STR     R0,[R2,#taskhandle]
610 .InitExit
620 LDMFD   (sp)!,{R7-R11,pc}
630 .StarCommand `
640 STMFD   (sp)!,{link}
650 MOV     R2,R0
660 ADR     R1,TitleString
670 MOV     R0,#2
680 SWI     "XOS_Module"
690 LDMFD   (sp)!,{pc}
700 .StartCode
710 LDR     wp,[R12]
720 LDR     R0,[wp,#taskhandle]
730 TEQ     R0,#0
740 LDRGT   R1,TASK
750 SWIGT   "XWimp_CloseDown"
760 MOVGT   R0,#0
770 STRGT   R0,[wp,#taskhandle]
780 MOV     R0,#200
790 LDR     R1,TASK
800 ADR     R2,TitleString
810 SWI     "XWimp_Initialise"
820 SWIVS   "XOS_Exit"
830 STR     R1,[R12,#taskhandle]
840 .repeat LDR     R0,mask
850 MOV     R1,wp
860 SWI     "XWimp_Poll"
870 CMP     R0,#17
880 CMPNE   R0,#18
890 BNE     repeat
900 LDR     R0,[wp,#16]
910 CMP     R0,#0
920 SWIEQ   "XWimp_CloseDown"
930 MOVEQ   R1,#0
940 STREQ   R1,[wp,#taskhandle]
950 SWIEQ   "XOS_Exit"
960 CMP     R0,#5
970 BNE     repeat
980 SWI     "XOS_ReadMonotonicTime"
990 MOV     R10,R0
1000 .wait  SWI     "XOS_Mouse"
1010 CMP    R2,#0
1020 BEQ    repeat
1030 SWI    "XOS_ReadMonotonicTime"
1040 SUB    R0,R0,R10
1050 CMP    R0,#20
1060 BLT    wait
1070 MOV    R10,R2
1080 LDR    R0,[wp,#taskhandle]
1090 LDR    R1,[wp,#4]
1100 CMP    R0,R1
1110 BEQ    repeat
1120 LDR    R0,[wp,#8]
1130 STR    R0,[wp,#12]
1140 MOV    R0,#19
1150 MOV    R1,wp
1160 LDR    R2,[wp,#4]
1170 SWI    "XWimp_SendMessage"
1180 LDR    R0,[wp,#40]
1190 CMP    R0,#&1000
1200 BLT    loadafile
1210 MOV    R0,#13
1220 ADD    R1,wp,#44
1230 MOV    R2,#0
1240 SWI    "XOS_FSControl"
1250 STR    R1,[wp,#20]
1260 ADD    R1,wp,#44
1270 ADD    R2,wp,#28
1280 .copyname
1290 LDRB   R0,[R1],#1
1300 CMP    R0,#ASC"."
1310 MOVEQ  R3,R2
1320 STRB   R0,[R2],#1
1330 CMP    R0,#0
1340 BNE    copyname
1350 CMP    R10,#1
1360 BNE    keepopen
1370 MOV    R0,#0
1380 STRB   R0,[R3]
1390 MOV    R0,#&400
1400 ORR    R0,R0,#1
1410 STR    R0,[wp,#16]
1420 MOV    R0,#17
1430 MOV    R1,wp
1440 MOV    R2,#0
1450 STR    R2,[wp,#4]
1460 STR    R2,[wp,#8]
1470 STR    R2,[wp,#12]
1480 STR    R2,[wp,#24]
1490 SWI    "XWimp_SendMessage"
1500 .keepopen
1510 MOV    R0,#ASC"."
1520 STRB   R0,[R3]
1530 MOV    R0,#&400
1540 STR    R0,[wp,#16]
1550 MOV    R0,#17
1560 MOV    R1,wp
1570 MOV    R2,#0
1580 STR    R2,[wp,#4]
1590 STR    R2,[wp,#8]
1600 STR    R2,[wp,#12]
1610 STR    R2,[wp,#24]
1620 SWI    "XWimp_SendMessage"
1630 B      repeat
1640 .loadafile
1650 MOV    R0,#&FF
1660 ORR    R0,R0,#&F00
1670 STR    R0,[wp,#40]
1680 MOV    R0,#17
1690 MOV    R1,wp
1700 MOV    R2,#0
1710 STR    R2,[wp,#4]
1720 STR    R2,[wp,#8]
1730 STR    R2,[wp,#12]
1740 SWI    "XWimp_SendMessage"
1750 B      repeat
1760 .FinalCode
1770 STMFD  (sp)!,{R7-R11,link}
1780 LDR    wp,[R12]
1790
1800 LDR    R0,[wp,#taskhandle]
1810 TEQ    R0,#0
1820 LDRGT  R1,TASK
1830 SWIGT  "XWimp_CloseDown"
1840 MOV    R1,#0
1850 STR    R1,[wp,#taskhandle]
1860 MOV    R0,#7
1870 MOV    R2,wp
1880 SWI    "OS_Module"
1890 LDMFD  (sp)!,{R7-R11,pc}
1900 .ServiceCode
1910 LDR    wp,[wp]
1920 STMFD  (sp)!,{link}
1930 TEQ    R1,#&49
1940 BEQ    StartWimp
1950 TEQ    R1,#&4A
1960 BEQ    StartedWimp
1970 TEQ    R1,#&27
1980 MOVEQ  R14,#0
1990 STREQ  R14,[wp,#taskhandle]
2000 LDMFD  (sp)!,{pc}
2010 .StartWimp
2020 LDR    R14,[wp,#taskhandle]
2030 TEQ    R14,#0
2040 MVNEQ  R14,#0
2050 STREQ  R14,[wp,#taskhandle]
2060 ADREQ  R0,HelpTable
2070 MOVEQ  R1,#0
2080 LDMFD  (sp)!,{pc}
2090 .StartedWimp
2100 LDR    R14,[wp,#taskhandle]
2110 CMN    R14,#1
2120 MOVEQ  R14,#0
2130 STREQ  R14,[wp,#taskhandle]
2140 LDMFD  (sp)!,{pc}
2150 .TASK  EQUS    "TASK"
2160 \ 1111111111000000000
2170 \ 9876543210987654321 0
2180 .mask  EQUD    %1000000110000011000 1
2190 ]NEXT
2200 SYS "OS_File",10,"%.DoubleTake",&FFA,,code%,O%
2210 *RMLoad %.DoubleTake
2220 END
```

Pieces of Eight

Listing 1

```
10 REM >SPsource (Po81)
20 REM By Jon Baldwin & Rod Smith
30 REM For BBC B/B+/M/E
40 REM (C) BAU January 1992 & November 1986
50 :
60 PROCass
70 PROCcheck
80 PRINT"Saving code..."
90 OSCLI"Save SPcode "+STR$~code+" "+STR$~O%+" 1500 1500"
100 END
110 :
120 DEF PROCass
130 DIM code 1000
140 osbyte=&FFF4:oswrch=&FFEE
150 at1=&70:at2=&72:at3=&74:at4=&76
160 bt1=&78:bt2=&7A:bt3=&7C:bt4=&7E
170 store=&80:ovflw=&81:flag=&82
180 temp%=&83:speed%=&84:count%=&85
190 type%=&1900:pnt%=&1A00
200 xi%=&1B00:xj%=&1C00
210 xl%=&1D00:xh%=&1E00
220 yi%=&1F00:yj%=&2000
230 yl%=&2100:yh%=&2200
240 FOR pass=4 TO 6 STEP 2
250 P%=&1500:O%=code
260 [OPT pass
270 .draw
280 JSR init
290 JSR plot
300 RTS
310 BRK
320 :
330 .trans
340 JSR init
350 .keyprs
360 LDA #0
370 STA flag
380 LDA #&0F
390 JSR &FFF4
400 LDA #&79
410 LDX #&80
420 JSR &FFF4
430 CPX #0
440 BMI main
450 JMP end
460 .main
470 LDX #&9E
480 JSR scan
490 BNE notz
500 JSR zpress
510 .notz
520 LDX #&E6
530 JSR scan
540 BNE notl
550 LDA #&EF
560 STA store
570 LDA #&FF
580 STA ovflw
590 JSR hpress
600 .notl
610 LDX #&86
620 JSR scan
630 BNE notr
640 LDA #&10
650 STA store
660 LDA #0
670 STA ovflw
680 JSR hpress
690 .notr
700 LDX #&C6
710 JSR scan
720 BNE notu
730 LDA #&10
740 STA store
750 LDA #0
760 STA ovflw
770 JSR vpress
780 .notu
790 LDX #&D6
800 JSR scan
810 BNE notd
820 LDA #&EF
830 STA store
840 LDA #&FF
850 STA ovflw
860 JSR vpress
870 .notd
880 LDX #&8C
890 JSR scan
900 BNE notxred
910 JSR plot
920 JSR xred
930 JSR plot
940 .notxred
950 LDX #&EB
960 JSR scan
970 BNE notxmag
980 JSR plot
990 JSR xmag
1000 JSR plot
1010 .notxmag
1020 LDX #&8B
1030 JSR scan
1040 BNE notyred
1050 JSR plot
1060 JSR yred
1070 JSR plot
1080 .notyred
1090 LDX #&8A
1100 JSR scan
1110 BNE notymag
1120 JSR plot
1130 JSR ymag
1140 JSR plot
1150 .notymag
1160 LDX #&E9
1170 JSR scan
1180 BNE notmin
1190 JSR plot
1200 JSR min
1210 JSR plot
1220 .notmin
1230 LDX #&89
1240 JSR scan
1250 BNE notmax
1260 JSR plot
1270 JSR max
1280 JSR plot
1290 .notmax
1300 JMP keyprs
1310 .end
1320 RTS
1330 :
1340 .init
1350 LDA #0
1360 STA at1
1370 STA at2
1380 STA at3
1390 STA at4
1400 STA bt1
1410 STA bt2
1420 STA bt3
1430 STA bt4
1440 STA count%
1450 LDA #29
1460 JSR oswrch
1470 LDA #&80
1480 JSR oswrch
1490 LDA #2
1500 JSR oswrch
1510 LDA #0
1520 JSR oswrch
1530 LDA #2
1540 JSR oswrch
1550 RTS
1560 :
1570 .scan
1580 LDA #&81
1590 LDY #&FF
1600 JSR &FFF4
1610 CPX #&FF
1620 RTS
1630 .inc
1640 LDY count%
1650 INY
1660 STY count%
1670 CPY speed%
1680 RTS
1690 :
1700 .plot
1710 LDY #&FF
1720 LDA #0
1730 STA flag
1740 LDA type%,Y
1750 TAX
1760 INX
1770 .plotlp
1780 LDA #&19
1790 JSR oswrch
1800 INY
1810 LDA type%,Y
1820 JSR oswrch
1830 LDA pnt%,Y
1840 STY temp%
1850 TAY
1860 LDA xl%,Y
1870 JSR oswrch
1880 LDA xh%,Y
1890 JSR oswrch
1900 LDA yl%,Y
1910 JSR oswrch
1920 LDA yh%,Y
1930 JSR oswrch
1940 LDY temp%
1950 DEX
1960 BNE plotlp
1970 LDA #0
1980 STA count%
1990 RTS
2000 :
2010 .zpress
2020 JSR plot
2030 .zinc
2040 JSR rotate
2050 LDA #&FF
2060 STA flag
2070 JSR inc
2080 BMI zinc
2090 JSR plot
2100 LDX #&9E
2110 JSR scan
2120 BEQ zpress
2130 RTS
2140 :
2150 .rotate
2160 LDA #&FF
2170 TAY
2180 LDA type%,Y
2190 TAX
2200 INX
2210 .rotlp
2220 CLC
2230 INY
2240 LDA #0
2250 STA at4
2260 LDA xh%,Y
2270 STA at3
2280 BPL raaa
2290 LDA #&FF
2300 STA at4
2310 SEC
```

```
2320 .raaa
2330 LDA xl%,Y
2340 STA at2
2350 LDA xj%,Y
2360 STA at1
2370 ROR at3
2380 ROR at2
2390 ROR at1
2400 SEC
2410 LDA xi%,Y
2420 SBC at1
2430 STA at1
2440 LDA xj%,Y
2450 SBC at2
2460 STA at2
2470 LDA xl%,Y
2480 SBC at3
2490 STA at3
2500 LDA xh%,Y
2510 SBC at4
2520 STA at4
2530 LDA yh%,Y
2540 STA bt4
2550 LDA yl%,Y
2560 STA bt3
2570 LDA yj%,Y
2580 STA bt2
2590 LDA yi%,Y
2600 STA bt1
2610 JSR raab
2620 SEC
2630 LDA at1
2640 SBC bt1
2650 STA at1
2660 LDA at2
2670 SBC bt2
2680 STA at2
2690 LDA at3
2700 SBC bt3
2710 STA at3
2720 LDA at4
2730 SBC bt4
2740 STA at4
2750 LDA xh%,Y
2760 STA bt4
2770 LDA xl%,Y
2780 STA bt3
2790 LDA xj%,Y
2800 STA bt2
2810 LDA xi%,Y
2820 STA bt1
2830 JSR raab
2840 LDA at4
2850 STA xh%,Y
2860 LDA at3
2870 STA xl%,Y
2880 LDA at2
2890 STA xj%,Y
2900 LDA at1
2910 STA xi%,Y
2920 CLC
2930 LDA #0
2940 STA at4
2950 LDA yh%,Y
2960 STA at3
2970 BPL raae
2980 LDA #&FF
2990 STA at4
3000 SEC
3010 .raae
3020 LDA yl%,Y
3030 STA at2
3040 LDA yj%,Y
3050 STA at1
3060 ROR at3
3070 ROR at2
3080 ROR at1
3090 SEC
3100 LDA yi%,Y
3110 SBC at1
3120 STA at1
3130 LDA yj%,Y
3140 SBC at2
3150 STA at2
3160 LDA yl%,Y
3170 SBC at3
3180 STA at3
3190 LDA yh%,Y
3200 SBC at4
3210 STA at4
3220 CLC
3230 LDA at1
3240 ADC bt1
3250 STA yi%,Y
3260 LDA at2
3270 ADC bt2
3280 STA yj%,Y
3290 LDA at3
3300 ADC bt3
3310 STA yl%,Y
3320 LDA at4
3330 ADC bt4
3340 STA yh%,Y
3350 DEX
3360 BNE rotlpj
3370 RTS
3380 :
3390 .rotlpj
3400 JMP rotlp
3410 .raab
3420 LDA #4
3430 STA store
3440 CLC
3450 .raac
3460 LDA bt4
3470 BPL raad
3480 SEC
3490 .raad
3500 ROR bt4
3510 ROR bt3
3520 ROR bt2
3530 ROR bt1
3540 CLC
3550 DEC store
3560 BNE raac
3570 RTS
3580 :
3590 .hpress
3600 JSR plot
3610 .hloop1
3620 LDY #&FF
3630 LDA &1900,Y
3640 TAX
3650 INX
3660 .hloop
3670 CLC
3680 INY
3690 LDA xl%,Y
3700 ADC store
3710 STA xl%,Y
3720 LDA xh%,Y
3730 ADC ovflw
3740 STA xh%,Y
3750 DEX
3760 BNE hloop
3770 LDA #&FF
3780 STA flag
3790 JSR inc
3800 BMI hloop1
3810 JSR plot
3820 RTS
3830 :
3840 .vpress
3850 JSR plot
3860 .vloop1
3870 LDY #&FF
3880 LDA type%,Y
3890 TAX
3900 INX
3910 .vloop
3920 CLC
3930 INY
3940 LDA yl%,Y
3950 ADC store
3960 STA yl%,Y
3970 LDA yh%,Y
3980 ADC ovflw
3990 STA yh%,Y
4000 DEX
4010 BNE vloop
4020 LDA #&FF
4030 STA flag
4040 JSR inc
4050 BMI vloop1
4060 JSR plot
4070 RTS
4080 :
4090 .xred
4100 LDA #0
4110 STA store
4120 STA ovflw
4130 JSR scale
4140 RTS
4150 :
4160 .xmag
4170 LDA #0
4180 STA store
4190 LDA #&FF
4200 STA ovflw
4210 JSR scale
4220 RTS
4230 :
4240 .yred
4250 LDA #&FF
4260 STA store
4270 LDA #0
4280 STA ovflw
4290 JSR scale
4300 RTS
4310 :
4320 .ymag
4330 LDA #&FF
4340 STA store
4350 STA ovflw
4360 JSR scale
4370 RTS
4380 :
4390 .min
4400 JSR xred
4410 JSR yred
4420 RTS
4430 :
4440 .max
4450 JSR xmag
4460 JSR ymag
4470 RTS
4480 :
4490 .scale
4500 LDA #0
4510 STA bt1
4520 STA bt2
4530 STA bt3
4540 STA bt4
4550 LDY &19FF
4560 LDA store
4570 BNE ysetup
4580 .xsetup
4590 LDA #&1B
4600 STA bt1+1
4610 LDA #&1C
4620 STA bt2+1
4630 LDA #&1D
4640 STA bt3+1
4650 LDA #&1E
4660 STA bt4+1
4670 JMP scalp
4680 .ysetup
4690 LDA #&1F
4700 STA bt1+1
4710 LDA #&20
4720 STA bt2+1
4730 LDA #&21
4740 STA bt3+1
4750 LDA #&22
4760 STA bt4+1
4770 .scalp
4780 LDA (bt4),Y
4790 STA at4
4800 LDA (bt3),Y
4810 STA at3
4820 LDA (bt2),Y
4830 STA at2
4840 LDA (bt1),Y
4850 STA at1
4860 LDX #3
4870 .dlp
4880 CLC
4890 LDA at4
4900 BPL pos
4910 SEC
4920 .pos
4930 ROR at4
4940 ROR at3
4950 ROR at2
4960 ROR at1
4970 DEX
4980 BNE dlp
4990 LDA ovflw
5000 BNE larger
5010 .smaller
5020 LDA (bt1),Y
5030 SEC
5040 SBC at1
5050 STA (bt1),Y
5060 LDA (bt2),Y
5070 SBC at2
5080 STA (bt2),Y
5090 LDA (bt3),Y
5100 SBC at3
5110 STA (bt3),Y
5120 LDA (bt4),Y
5130 SBC at4
5140 STA (bt4),Y
5150 JMP scend
5160 .larger
5170 CLC
5180 LDA at1
5190 ADC (bt1),Y
5200 STA (bt1),Y
5210 LDA at2
5220 ADC (bt2),Y
5230 STA (bt2),Y
5240 LDA at3
5250 ADC (bt3),Y
5260 STA (bt3),Y
5270 LDA at4
5280 ADC (bt4),Y
5290 STA (bt4),Y
5300 .scend
5310 DEY
5320 CPY #&FF
5330 BNE scalp
5340 RTS
5350 ]
5360 NEXT
5370 ENDPROC
5380 :
5390 DEF PROCcheck
5400 LOCAL sum%
5410 sum%=0
5420 FOR byte%=code TO O%-1
5430 sum%=sum%+?byte%
5440 NEXT byte%
5450 P%=P%-&1500
5460 IF sum%=101408 ENDPROC
5470 PRINT "Checksum error - please che
ck listing"
5480 END
```

Listing 2

```
   10 REM >SuperPL (Po82)
   20 REM By Jonathan Baldwin
   30 REM For BBC B/B+/M/E
   40 REM (C) BAU January 1992 & Novembe
r 1986
   50 :
   60 IF PAGE<&2300 THEN PAGE=&2300:CHAI
N"SuperPL"
   70 MODE 4
   80 *Load SPCode
   90 PROCinit
  100 PROCdis(t$)
  110 PROCdel
  120 PROCset:PROCbox(nx%,ny%)
  130 ON ERROR PROCerr
  140 IF c%=FALSE PROCload
  150 PROCmain
  160 MODE 7
  170 END
  180 :
  190 DEF PROCmain
  200 REPEAT
  210 PROCi(3,s$)
  220 REPEAT
  230 *FX 15
  240 PROCcm:PROCcoord
  250 IF (nx%<>vx% OR ny%<>vy%) PROCsq
  260 IF (INKEY-99 AND fl%=TRUE) PROCban
d
  270 IF INKEY-2 nx%=0:ny%=0
  280 IF INKEY-90 CLG:PROCnew:PROCbox(nx
%,ny%)
  290 IF in%<1 GOTO 380
  300 IF INKEY-21 PROCmir
  310 IF INKEY-117 PROCplus
  320 IF INKEY-118 PROCminus
  330 IF INKEY-23 PROCpt
  340 IF INKEY-119 PROCends
  350 IF INKEY-1 PROCmac
  360 *FX200
  370 ?&19FF=in%:?&1AFF=N%
  380 UNTIL (in%>&FD OR INKEY-97 OR INKE
Y-33)
  390 PROCset
  400 IF INKEY-33 PROCsave:PROCldata:PRO
Cload ELSE PROCch
  410 UNTIL G%>2 AND G%<5
  420 *FX 4
  430 ENDPROC
  440 :
  450 DEF PROCinit
  460 *FX 4,1
  470 VDU 29,640;512;19,0,4;0;
  480 VDU 23;11,0;0;0;0
  490 PROCbdr(-639,-511,639,340)
  500 PROCbdr(-630,410,630,496)
  510 PROCbdr(-639,398,639,508)
  520 s$="<SPACE> TO DRAW: <FN>KEYS TO E
DIT"
  530 t$="***SUPER-PLOT***"
  540 a$="<-> "
  550 b$="ARROWS MOVE BOX: <RET> FIXES"
  560 DIM cli% 40
  570 in%=-1:N%=-1:?&19FF=in%:?&1AFF=N%
  580 type%=&1900:pnt%=&1A00
  590 ?type%=4:?pnt%=0
  600 xi%=&1B00:xj%=&1C00
  610 xl%=&1D00:xh%=&1E00
  620 yi%=&1F00:yj%=&2000
  630 yl%=&2100:yh%=&2200
  640 c%=FALSE:fl%=TRUE
  650 nx%=0:ny%=0:ic%=12:es%=1
  660 speed%=&84:J%=0:V%=0
  670 PROCcalc(0):GCOL 3,3
  680 VDU 24,-635;-508;635;338;
  690 ENDPROC
  700 :
  710 DEF PROCbdr(xl,yb,xr,yt)
  720 PLOT 12,xl,yb:PLOT14,xr,yb
  730 PLOT 14,xr,yt:PLOT14,xl,yt
  740 PLOT 14,xl,yb
  750 ENDPROC
  760 :
  770 DEF PROCnew
  780 in%=-1:N%=-1:J%=0:V%=0
  790 PROCcalc(0):?type%=4:?pnt%=0
  800 ENDPROC
  810 :
  820 DEF FNx(r%)=xl%?r%+xh%?r%*256
  830 :
  840 DEF FNy(r%)=yl%?r%+yh%?r%*256
  850 :
  860 DEF FNg
  870 REPEAT
  880 G%=INSTR("YyNn",GET$)
  890 UNTIL G%>0 AND G%<5
  900 =G%
  910 :
  920 DEF FNchoose
  930 PROCprbox(J%,0)
  940 IF J%>N% J%=N%
  950 es%=es%+1
  960 REPEAT
  970 IF INKEY-26 PROCbk
  980 IF INKEY-122 PROCfwd
  990 UNTIL INKEY-74 AND fl%=TRUE
 1000 =J%
 1010 :
 1020 DEF PROCbk
 1030 PROCbox(ox%,oy%)
 1040 J%=J%-1
 1050 IF J%<0 J%=N%
 1060 PROCprbox(J%,0)
 1070 fl%=TRUE
 1080 ENDPROC
 1090 :
 1100 DEF PROCfwd
 1110 PROCbox(ox%,oy%)
 1120 J%=J%+1
 1130 IF J%>N% J%=0
 1140 PROCprbox(J%,0)
 1150 fl%=TRUE
 1160 ENDPROC
 1170 :
 1180 DEF PROCset
 1190 PROCset2:ox%=nx%:oy%=ny%
 1200 ENDPROC
 1210 :
 1220 DEF PROCset2
 1230 vx%=nx%:vy%=ny%:ENDPROC
 1240 :
 1250 DEF PROCcoord
 1260 IF INKEY-58 ny%=ny%+ic%:fl%=TRUE
 1270 IF INKEY-42 ny%=ny%-ic%:fl%=TRUE
 1280 IF INKEY-26 nx%=nx%-ic%:fl%=TRUE
 1290 IF INKEY-122 nx%=nx%+ic%:fl%=TRUE
 1300 ENDPROC
 1310 :
 1320 DEF PROCcm
 1330 IF INKEY-114 ic%=4:?speed%=0:VDU 7
 1340 IF INKEY-115 ic%=12:?speed%=4:VDU
7
 1350 IF INKEY-116 ic%=20:?speed%=8:VDU
7
 1360 ENDPROC
 1370 :
 1380 DEF PROCsq
 1390 PROCbox(vx%,vy%):PROCset2
 1400 PROCbox(nx%,ny%)
 1410 ENDPROC
 1420 :
 1430 DEF PROCbox(x%,y%)
 1440 PLOT 69,x%,y%:PLOT 12,x%-12,y%-12
 1450 PLOT 13,x%+12,y%-12
 1460 PLOT 13,x%+12,y%+12
```

```
1470 PLOT 13,x%-12,y%+12
1480 PLOT 13,x%-12,y%-12
1490 ENDPROC
1500 :
1510 DEF PROCband
1520 PROCbox(nx%,ny%):PROCset
1530 es%=0:N%=N%+1
1540 PROCinc(12,N%):PROCcalc(N%)
1550 fl%=FALSE:f%=FALSE
1560 PROCdis("*RUBBER-BANDING*")
1570 PROCi(3,"<SPACE> TO KEEP: <RETURN>
TO DROP")
1580 REPEAT
1590 PROCcoord:PROCcm
1600 IF nx%<>vx% OR ny%<>vy% PROCrub
1610 IF INKEY-99 AND fl%=TRUE PROCadd
1620 UNTIL INKEY-74 OR in%>&FD
1630 PLOT 12,ox%,oy%:PLOT 13,nx%,ny%
1640 IF f%=FALSE N%=N%-1:in%=in%-1
1650 ?&19FF=in%:?&1AFF=N%
1660 fl%=TRUE:es%=1
1670 PROCbox(nx%,ny%):PROCtitle
1680 ENDPROC
1690 :
1700 DEF PROCrub
1710 PROCline(vx%,vy%)
1720 PROCline(nx%,ny%):PROCset2
1730 ENDPROC
1740 :
1750 DEF PROCadd
1760 N%=N%+1:PROCinc(13,N%)
1770 PROCcalc(N%):PROCset
1780 fl%=FALSE:f%=TRUE
1790 ENDPROC
1800 :
1810 DEF PROCline(x%,y%)
1820 PLOT 12,ox%,oy%:PLOT 13,x%,y%
1830 ENDPROC
1840 :
1850 DEF PROCinc(t%,n%)
1860 in%=in%+1:type%?in%=t%:pnt%?in%=n%
1870 ENDPROC
1880 :
1890 DEF PROCcalc(n%)
1900 !&70=nx%:!&78=ny%
1910 PROCcalx(n%):PROCcaly(n%)
1920 ENDPROC
1930 :
1940 DEF PROCcalx(n%)
1950 xl%?n%=?&70:xh%?n%=?&71
1960 xi%?n%=?&72:xj%?n%=?&73
1970 ENDPROC
1980 :
1990 DEF PROCcaly(n%)
2000 yl%?n%=?&78:yh%?n%=?&79
2010 yi%?n%=?&7A:yj%?n%=?&7B
2020 ENDPROC
2030 :
2040 DEF PROCdraw
2050 IFin%<1 ENDPROC
2060 ?&19FF=in%:?&1AFF=N%
2070 CALL &1500
2080 ENDPROC
2090 :
2100 DEF PROCtitle
2110 PROCtop:PROCi(3,s$)
2120 PROCdis(t$)
2130 ENDPROC
2140 :
2150 DEF PROCch
2160 IF in%=-1 GOTO 2220
2170 PROCi(6,"THIS PICTURE DELETED? <Y/
N>")
2180 G%=FNg
2190 IF G%<3 PROCdraw ELSE PROCsave
2200 PROCnew
2210 IF G%>2 PROCload:ENDPROC
2220 PROCi(8,"CONTINUE PROGRAM? <Y/N>")
2230 G%=FNg:IF G%<3 PROCload
2240 ENDPROC
2250 :
2260 DEF PROCload
2270 PROCtop
2280 PRINTTAB(3,1);"1:START DRAWING " T
AB(21,1);"2:LOAD FILE ONLY"
2290 PRINTTAB(9,2);"3:LOAD FILE WITH IM
AGE"
2300 f%=FALSE
2310 REPEAT
2320 PROCi(9,"PRESS NUMBER OF CHOICE")
2330 G%=GET
2340 IF G%=49 f%=TRUE
2350 IF G%=50 PROCld
2360 IF G%=51 PROCld:PROCdraw
2370 UNTIL f%=TRUE
2380 PROCtop:PROCtitle
2390 ENDPROC
2400 :
2410 DEF PROCld
2420 REPEAT:PROCin
2430 UNTIL LEN(fn$)<8
2440 REM:CASSETTE USERS ONLY
2450 REM:VDU 28,0,4,39,4
2460 PROCoscli("LOAD "+fn$)
2470 PROCldata
2480 REM:VDU 28,0,31,39,0
2490 ENDPROC
2500 :
2510 DEF PROCldata
2520 in%=?&19FF:N%=?&1AFF
2530 RESTORE 2610
2540 FOR F%=3 TO 0 STEP-1
2550 READ ad%
2560 st%=&1B00+(N%+1)*F%
2570 FOR T%=0 TO N%
2580 ad%?T%=st%?T%
2590 NEXT T%
2600 NEXT F%
2610 DATA yh%,yl%,xh%,xl%
2620 ENDPROC
2630 :
2640 DEF PROCsave
2650 IF in%<0 ENDPROC
2660 PROCdis("**DATA-SAVING**")
2670 REPEAT
2680 PROCin
2690 UNTIL LEN(fn$)<8
2700 REM:CASSETTE USERS ONLY
2710 REM:VDU 28,0,4,39,4
2720 RESTORE 2830
2730 FOR F%=0 TO 3
2740 st%=&1B00+((N%+1)*F%)
2750 READ ad%
2760 FOR T%=0 TO N%
2770 st%?T%=ad%?T%
2780 NEXT T%
2790 NEXT F%
2800 M%=&FFFF1900
2810 W%=(&FFFF1B00+(N%+1)*4)
2820 IF fn$<>"" PROCoscli("SAVE "+fn$+"
"+STR$~M%+" "+STR$~W%)
2830 DATA xl%,xh%,yl%,yh%
2840 REM:VDU 28,0,31,39,0
2850 ENDPROC
2860 :
2870 DEF PROCin
2880 PROCi(3,"PICTURE'S NAME?")
2890 INPUT SPC(1)fn$
2900 ENDPROC
2910 :
2920 DEF PROCi(n%,m$)
2930 *FX 15
2940 PRINTTAB(0,4);SPC(40)
2950 le%=LEN(m$)+n%+1
2960 PRINTTAB(n%,4);m$
2970 VDU 31,le%,4
2980 ENDPROC
2990 :
3000 DEF PROCtop
3010 FOR T%=1 TO 2
3020 PRINTTAB(1,T%);STRING$(38," ")
3030 NEXT T%
3040 ENDPROC
3050 :
3060 DEF PROCoscli($cli%)
3070 X%=cli%:Y%=cli% DIV 256
3080 CALL &FFF7
3090 ENDPROC
3100 :
3110 DEF PROCmir
3120 *FX 15,1
3130 PROCdraw
3140 FOR T%=0 TO N%+1
3150 ?&70=xl%?T%:?&71=xh%?T%
3160 ?&72=xi%?T%:?&73=xj%?T%
3170 !&70=-!&70:PROCcalx(T%)
3180 NEXT T%
3190 PROCdraw
3200 ENDPROC
3210 :
3220 DEF PROCpt
3230 PROCdis("***POINT-EDIT***")
3240 PROCi(3,a$+b$)
3250 PROCbox(nx%,ny%)
3260 pt%=FNchoose
3270 nx%=FNx(pt%):ny%=FNy(pt%)
3280 es%=1:fl%=FALSE
3290 PROCset2
3300 PROCi(3,b$+" POINT")
3310 REPEAT
3320 *FX 15
3330 PROCcoord:PROCcm
3340 IF nx%<>vx% OR ny%<>vy% PROCsq
3350 UNTIL INKEY-74 AND fl%=TRUE
3360 PROCdraw:PROCcalc(pt%)
3370 PROCdraw
3380 PROCset:PROCtitle
3390 ENDPROC
3400 :
3410 DEF PROCplus
3420 PROCdis("*LINE-ADDITIONS*")
3430 PROCi(0,a$+b$+" START")
3440 PROCbox(nx%,ny%)
3450 st%=FNchoose
3460 PROCi(1,a$+b$+" END")
3470 fl%=FALSE
3480 J%=J%+1:IF J%>=N% J%=0
3490 end%=FNchoose
3500 IF st%=end% PROCbox(nx%,ny%):PROCt
itle:ENDPROC
3510 PROCdraw
3520 T%=-1:f%=FALSE
3530 REPEAT
3540 T%=T%+1:PROCslot(st%,end%)
3550 PROCslot(end%,st%)
3560 UNTIL T%=in%-1 OR f%=TRUE
3570 PROCcr(st%,end%)
3580 PROCcr(end%,st%)
3590 IF f%=FALSE PROCinc(12,st%):PROCin
c(13,end%)
3600 PROCcheck
3610 PROCprbox(st%,0)
3620 PROCprbox(end%,0)
3630 es%=1:PROCdraw
3640 PROCbox(nx%,ny%):PROCtitle
3650 ENDPROC
3660 :
3670 DEF PROCslot(be%,fi%)
3680 IF pnt%?T%=be% AND pnt%?(T%+1)=fi%
type%?(T%+1)=13:f%=TRUE
3690 ENDPROC
3700 :
3710 DEF PROCcr(be%,fi%)
3720 IF f%=TRUE OR be%<>pnt%?in% ENDPRO
C
3730 in%=in%+1:pnt%?in%=fi%:type%?in%=1
3
3740 f%=TRUE
3750 ENDPROC
3760 :
3770 DEF PROCcheck
3780 D%=-1:REPEAT
3790 D%=D%+1
3800 IF (type%?D%=12 AND type%?(D%+1)=1
2) OR pnt%?D%=pnt%?(D%+1) PROCout:in%=in
%-1
3810 UNTIL D%=in%-1
3820 IF type%?in%=12 in%=in%-1
3830 ENDPROC
3840 :
3850 DEF PROCout
3860 IF type%?D%=13 W%=D%+1 ELSE W%=D
3870 FOR I%=W% TO in%-1
3880 pnt%?I%=pnt%?(I%+1):type%?I%=type%
?(I%+1)
3890 NEXT
3900 ENDPROC
3910 :
3920 DEF PROCprbox(T%,Q%)
3930 IF Q%=1 E%=pnt%?T% ELSE E%=T%
3940 ox%=FNx(E%):oy%=FNy(E%)
3950 PROCbox(ox%,oy%)
3960 ENDPROC
3970 :
3980 DEF PROCends
3990 PROCdis("HIDDEN-LINE-EDIT")
4000 PROCbox(nx%,ny%):PROCgetln
4010 *FX 200,1
4020 PROCi(2,"<SPACE> CHOOSES END: <RET
URN> TO FIX")
4030 PROCprex(V%):U%=V%
4040 *FX 15
4050 REPEAT:G%=GET
4060 IF G%=32 PROCmx
4070 UNTIL G%=13
4080 PROCprex(U%)
4090 IF U%=V% E%=pnt%?(V%+1):F%=pnt%?V%
ELSE E%=pnt%?V%:F%=pnt%?(V%+1)
4100 ox%=FNx(E%):oy%=FNy(E%)
4110 nx%=FNx(F%):ny%=FNy(F%)
4120 PROCset2:fl%=FALSE
4130 PROCi(0,b$+" <SPC>DROPS")
4140 REPEAT
4150 PROCcoord:PROCcm
4160 IF nx%<>vx% OR ny%<>vy% PROCrub:fl
%=TRUE
4170 UNTIL(INKEY-99 OR(INKEY-74 AND fl%
=TRUE))
4180 PROCbox(nx%,ny%)
4190 IF INKEY-99 PROCret:ENDPROC
4200 IF U%=in% PROCfind(U%):IF f%=FALSE
PROCmv:ENDPROC
4210 N%=N%+1:PROCcalc(N%)
4220 FOR T%=in% TO V%+1 STEP-1
4230 type%?(T%+1)=type%?T%
4240 pnt%?(T%+1)=pnt%?T%
4250 NEXT T%
4260 in%=in%+1:pnt%?(V%+1)=N%
4270 IF V%=U% PROCtp(12,13):PROCplot(69
,F%):PROCplot(69,N%) ELSE PROCtp(13,12)
4280 PROCdraw
4290 IF V%=U% IF type%?(V%)=12 PROCedit
(V%)
4300 IF V%<>U% AND V%+2<in% IF type%?(V
%+3)=12 PROCedit(V%+2)
4310 PROCcheck:PROCdraw
4320 PROCtitle
4330 ENDPROC
4340 :
4350 DEF PROCret
4360 PROCline(nx%,ny%)
4370 PROCplot(12,E%)
4380 PROCplot(13,F%):PROCtitle
4390 ENDPROC
4400 :
4410 DEF PROCtp(a%,b%)
4420 type%?(V%+1)=a%
4430 type%?(V%+2)=b%
4440 ENDPROC
4450 :
4460 DEF PROCmx
4470 IF U%=V% PROCprex(U%):U%=V%+1:PROC
prex(U%) ELSE PROCprex(U%):U%=V%:PROCpre
x(U%)
4480 ENDPROC
4490 :
4500 DEF PROCplot(n%,r%)
4510 PLOT n%,FNx(r%),FNy(r%)
4520 ENDPROC
4530 :
4540 DEF PROCprex(T%)
4550 E%=pnt%?T%
4560 x%=FNx(E%):y%=FNy(E%)
4570 PLOT 4,x%-18,y%-18
4580 PLOT 6,x%+18,y%+18
4590 PLOT 4,x%-18,y%+18
4600 PLOT 6,x%+18,y%-18
4610 ENDPROC
4620 :
4630 DEF PROCmv
4640 B%=pnt%?in%
4650 PROCcalc(B%)
4660 PROCtitle
4670 ENDPROC
4680 :
4690 DEF PROCminus
4700 PROCdis("**LINE-REMOVAL**")
4710 PROCbox(nx%,ny%)
4720 PROCgetln:PROCdraw
4730 IF type%?V%=12 PROCedit(V%):type%?
V%=12:V%=V%-1
4740 IF V%=in%-1 OR type%?(V%+2)=12 PRO
Cedit(V%+1):type%?(V%+1)=12:PROCcheck EL
SE type%?(V%+1)=12
4750 IF in%>0 PROCdraw ELSE in%=-1:N%=-
1
4760 PROCbox(nx%,ny%):PROCtitle
4770 ENDPROC
4780 :
4790 DEF PROCgetln
4800 PROCi(0,"<->ARROWS PUT BOXES ON E
NDS <RET> FIXES")
4810 es%=-1
4820 IF V%>=in% V%=0
4830 REPEAT
4840 IF type%?(V%+1)=12 V%=V%+1
4850 UNTIL type%?(V%+1)=13
4860 PROCprbox(V%,1):PROCprbox(V%+1,1)
4870 REPEAT
4880 IF INKEY-26 PROCprbox(V%,1):PROCpr
box(V%+1,1):PROCdwn:PROCprbox(V%,1):PROC
prbox(V%+1,1)
4890 IF INKEY-122 PROCprbox(V%,1):PROCp
rbox(V%+1,1):PROCup:PROCprbox(V%,1):PROC
prbox(V%+1,1)
4900 UNTIL INKEY-74
4910 es%=1
4920 PROCprbox(V%,1):PROCprbox(V%+1,1)
4930 ENDPROC
4940 :
4950 DEF PROCup
4960 IF V%=in%-1 V%=-1
4970 T%=V%+2:PROCln(1)
4980 ENDPROC
4990 :
5000 DEF PROCdwn
5010 IF V%=0 V%=in%
5020 T%=V%:PROCln(-1)
5030 ENDPROC
5040 :
5050 DEF PROCln(K%)
5060 REPEAT
5070 IF type%?T%=12 T%=T%+K%
5080 UNTIL type%?T%=13
5090 V%=T%-1
5100 ENDPROC
5110 :
5120 DEF PROCedit(t%)
5130 PROCfind(t%)
5140 IF f%=FALSE PROCscrub(t%) ELSE PRO
Cpass(t%)
5150 ENDPROC
5160 :
5170 DEF PROCfind(r%)
5180 T%=-1:f%=FALSE
5190 REPEAT
5200 T%=T%+1
5210 IF T%<>r% AND pnt%?r%=pnt%?T% AND(
type%?T%=13 OR type%?(T%+1)=13) f%=TRUE
5220 UNTIL(T%=in% OR f%=TRUE)
5230 ENDPROC
5240 :
5250 DEF PROCscrub(r%)
5260 IF pnt%?r%<N% PROCshft(r%)
5270 N%=N%-1:v%=pnt%?r%
5280 FOR T%=0 TO in%
5290 IF pnt%?T%>v% pnt%?T%=pnt%?T%-1
5300 NEXT T%
5310 PROCpass(r%)
5320 ENDPROC
5330 :
5340 DEF PROCshft(r%)
5350 FOR T%=pnt%?r% TO N%-1
5360 xl%?T%=xl%?(T%+1)
5370 xh%?T%=xh%?(T%+1)
5380 xi%?T%=xi%?(T%+1)
5390 xj%?T%=xj%?(T%+1)
5400 yl%?T%=yl%?(T%+1)
5410 yh%?T%=yh%?(T%+1)
5420 yi%?T%=yi%?(T%+1)
5430 yj%?T%=yj%?(T%+1)
5440 NEXT
5450 ENDPROC
5460 :
5470 DEF PROCpass(r%)
5480 FOR T%=r% TO in%-1
5490 type%?T%=type%?(T%+1)
5500 pnt%?T%=pnt%?(T%+1)
5510 NEXT T%
5520 in%=in%-1
5530 ENDPROC
5540 :
5550 DEF PROCdel
5560 TIME=0:REPEAT UNTIL TIME=200
5570 ENDPROC
5580 :
5590 DEF PROCdis(d$)
5600 LOCAL A%,X%,Y%
5610 A%=10:X%=0:Y%=10:b=&A00
5620 VDU 31,4,1
5630 FOR T%=1 TO LENd$
5640 p$=MID$(d$,T%,1)
5650 ?b=ASCp$
5660 CALL &FFF1
5670 VDU 23,240,b?1,b?1,b?2,b?2,b?3,b?3
,b?4,b?4
5680 VDU 23,241,b?5,b?5,b?6,b?6,b?7,b?7
,b?8,b?8
5690 VDU 240,8,10,241,11,9
5700 NEXT T%
5710 ENDPROC
5720 :
5730 DEF PROCmac
5740 PROCdis("MACRO-TRANSFORMS")
5750 PROCi(11,"MOVE WHOLE DESIGN.")
5760 CALL &1508
5770 PROCtitle
5780 ENDPROC
5790 :
5800 DEF PROCerr
5810 *FX 4
5820 c%=TRUE
5830 IF ERR=17 PROCesc("USE <TAB> TO EX
IT PROGRAM"):PROCtitle:ENDPROC
5840 IF ERR>&BE AND ERR<&FF PROCesc("FI
LE-SYSTEM ERROR"):PROCload:ENDPROC
```

```
5850 REPORT:PRINT" at line ";ERL:END
5860 ENDPROC
5870 :
5880 DEF PROCesc(i$)
5890 IF es%=0 PLOT 12,ox%,oy%:PLOT 13,n
x%,ny%
5900 IF es%<0 PROCprbox(V%,1):PROCprbox
(V%+1,1)
5910 IF es%>1 PROCprbox(J%,0)
5920 IF es%>2 PROCprbox(st%,0)
5930 IF es%<>1 PROCbox(nx%,ny%)
5940 PROCset:es%=1
5950 REM:VDU 28,0,4,39,4
5960 PROCi(7,i$):PROCdel
5970 REM:VDU 28,0,31,39,0
5980 ENDPROC
```

Listing 3

```
10 REM Screen Converter (Po83)
20 REM by Jonathan Baldwin
30 REM for BBC B/B+/M/E
40 REM (c) Acorn User November 1986
50 :
60 IF PAGE<&2300 PRINT"Page must be &
2300":END
70 ON ERROR VDU 26,12:REPORT:PRINT" a
t line ";ERL:END
80 *LOAD SPCODE 1500
90 MODE 7:REPEAT
100 INPUT"WHICH MODE",M%
110 UNTIL M%>=0 AND M%<6 AND M%<>3
120 MODE M%
130 PROCinit:REPEAT
140 PROCld:PROCdraw
150 UNTIL fn$=""
160 PROCsave
170 VDU 26,12:PRINT"Saved"
180 END
190 :
200 DEF PROCinit
210 VDU 29,640;512;
220 VDU 23;11,0;0;0;0
230 PROCbdr(-639,-511,639,340)
240 PROCbdr(-630,410,630,496)
250 PROCbdr(-639,398,639,508)
260 DIM cli% 40
270 in%=-1:N%=-1:?&19FF=in%:?&1AFF=N%
280 type%=&1900:pnt%=&1A00
290 ?type%=4:?pnt%=0
300 xi%=&1B00:xj%=&1C00
310 xl%=&1D00:xh%=&1E00
320 yi%=&1F00:yj%=&2000
330 yl%=&2100:yh%=&2200
340 nx%=0:ny%=0
350 VDU 24,-639;-512;639;340;
360 ENDPROC
370 :
380 DEF PROCbdr(xl,yb,xr,yt)
390 PLOT 4,xl,yb:PLOT 5,xr,yb
400 PLOT 5,xr,yt:PLOT 5,xl,yt
410 PLOT 5,xl,yb
420 ENDPROC
430 :
440 DEF PROCdraw
450 IF in%<1 ENDPROC
460 ?&19FF=in%:?&1AFF=N%
470 CALL &1500
480 ENDPROC
490 :
500 DEF PROCld
510 PRINTTAB(2,1);"LOADING FILES"
520 PROCin:IF fn$="" ENDPROC
530 VDU 28,0,4,39,4
540 PROCoscli("LOAD "+fn$)
550 in%=?&19FF:N%=?&1AFF
560 RESTORE 920
570 FOR F%=3 TO 0 STEP-1
580 READ ad%
590 st%=&1B00+(N%+1)*F%
600 FOR T%=0 TO N%
610 ad%?T%=st%?T%
620 NEXT T%
630 NEXT F%
640 VDU 28,0,31,39,0
650 ENDPROC
660 :
670 DEF PROCsave
680 IF M%>0 AND M%<3 U%=&3C80:W%=&8000
690 IF M%>3 AND M%<6 U%=&5800:W%=&8000
700 PRINTTAB(2,1);"SAVING SCREEN"
710 PROCin
720 PROCoscli("SAVE "+fn$+" "+STR$~U%+
" "+STR$~W%)
730 ENDPROC
740 :
750 DEF PROCin
760 PRINTTAB(2,4);STRING$(36," ")
770 PRINTTAB(2,2);"PICTURE'S NAME"
780 INPUTTAB(2,4);fn$
790 ENDPROC
800 :
810 DEF PROCtop
820 FOR T%=1 TO 2
830 PRINTTAB(1,T%);STRING$(38," ")
840 NEXT T%
850 ENDPROC
860 :
870 DEF PROCoscli($cli%)
880 X%=cli%:Y%=cli%DIV256
890 CALL &FFF7
900 ENDPROC
910 :
920 DATA yh%,yl%,xh%,xl%
```

Listing 4

```
10 REM >SuperPa (Po84)
20 REM By Jon Baldwin
30 REM For BBC B/B/M/E/C
40 REM (C) BAU January 1991 & January
1986
50 :
60 IF PAGE<>&1500 THEN PAGE=&1500:CHA
IN "SuperPa"
70 DIM cst%(1),ast%(1),oscli% 40
80 colfill=&1200:*LOAD ColFill 1200
90 *FX 18
100 *FX 11
110 *FX 4,2
120 MODE 1:VDU 23;8202;0;0;0;
130 VDU 19,1,0;0;19,2,0;0;19,3,0;0;
140 PROCmenu:VDU 20
150 PROCsetvars
160 ON ERROR PROCerr
170 VDU 5:REPEAT
180 IF NOT INKEY(-129) PROCkey
190 PROCcur
200 IF L%=0 PROCcheck
210 UNTIL Z%
220 PROCms(0,"end")
230 END
240 :
250 DEF PROCsetvars
260 K%=5:Z%=0
270 V%=0:H%=0
280 C%=3:T%=3
290 X%=640:Y%=512
300 L%=0:A%=X%:B%=Y%
310 D%=16:tilt=0
320 cx=48:cy=48
330 S%=1:R%=1
340 VDU 24,0;32;1279;860;
350 ENDPROC
360 :
370 DEF PROCkey
380 *FX 21
390 IF INKEY-51 PLOT 69,X%,Y%
400 IF INKEY-97 VDU7:PLOT 95,X%,Y%
410 IF INKEY-118 AND INKEY-1 CLG:PROCb
ase
420 IF INKEY-106 PROCcopys
430 IF INKEY-90 PROCdumps
440 IF INKEY-55 L%=NOT L%:PROCdel(30)
450 IF INKEY-38 PROCms(0,"Rubbing out"
):C%=C% EOR 7
460 IF INKEY-68 PROCrub
470 IF INKEY-21 AND INKEY-1 PROCsave
480 IF INKEY-33 AND INKEY-1 PROCload
490 IF INKEY-33 PROCsqr
500 IF INKEY-82 PROCdist
510 IF INKEY-87 AND INKEY-1 PROCloadna
me
520 IF INKEY-114 PROCcirc
530 IF INKEY-116 CALL colfill,X%,Y%,T%
540 IF INKEY-117 PROCmix
550 IF INKEY-118 PROCellipse
560 IF INKEY-83 PROCchng
570 IF INKEY-115 PROCprinter
580 IF INKEY-23 K%=5:VDU7
590 IF INKEY-119 K%=85:VDU7
600 IF INKEY-120 K%=21:VDU7
610 IF INKEY-21 PROCair
620 PROCspeed
630 IF INKEY-100 V%=NOT(V%)
640 IF INKEY-85 H%=NOT(H%)
650 PROCcm
660 IF INKEY-24 D%=4:VDU7
670 IF INKEY-88 D%=8:VDU7
680 IF INKEY-73 D%=16:VDU7
690 IF INKEY-103 AND cx>0 cx=cx-4
700 IF INKEY-104 cx=cx+4
710 IF INKEY-98 AND cy>0 cy=cy-4
720 IF INKEY-66 cy=cy+4
730 IF INKEY-102 S%=-1:VDU7
740 IF INKEY-86 R%=-1:VDU7
750 *FX 202,32
760 ENDPROC
770 :
780 DEF PROCcur
790 GCOL3,3
800 FOR Q%=1 TO2:*FX19
810 IF L% MOVE A%,B%:DRAW X%,Y%:GOTO87
0
820 MOVE X%-12,Y%:DRAW X%+12,Y%:MOVE X
%,Y%-12:DRAW X%,Y%+12
830 PLOT 69,X%+cx,Y%+cy
840 PLOT 69,X%+cx,Y%-cy
850 PLOT 69,X%-cx,Y%-cy
860 PLOT 69,X%-cx,Y%+cy
870 IF V% MOVE X%,0:DRAW X%,880
880 IF H% MOVE 0,Y%:DRAW 1279,Y%
890 NEXT Q%
900 GCOL 0,C%
910 ENDPROC
920 :
930 DEF PROCcheck
940 IF Y%>880 Y%=32
950 IF Y%<32 Y%=880
960 IF X%<0 X%=1270
970 IF X%>1270 X%=0
980 ENDPROC
990 :
1000 DEF PROCsqr
1010 MOVE X%-cx,Y%-cy:MOVE X%-cx,Y%-cy
1020 PLOT K%,X%-cx,Y%+cy
1030 PLOT K%,X%+cx,Y%+cy
1040 PLOT K%,X%+cx,Y%-cy
1050 PLOT K%,X%-cx,Y%-cy
1060 ENDPROC
1070 :
1080 DEF PROCmix
1090 PROCget
1100 VDU 7
1110 T%=(X%-4)DIV 90+(Y%-864)DIV 80*14
1120 IF T%=0 C%=3
1130 IF T%=4 C%=1
1140 IF T%=8 C%=2
1150 IF T%=12 C%=0
1160 X%=A%:Y%=B%
1170 ENDPROC
1180 :
1190 DEF PROCget
1200 VDU 26
1210 REPEAT
1220 L%=0:PROCspeed:PROCcm:PROCcur
1230 IF X%>1279 X%=2
1240 IF X%<0 X%=1279
1250 IF Y%<880 Y%=880
1260 IF Y%>1023 Y%=1023
1270 UNTIL INKEY-1
1280 VDU 24,0;32;1279;860;
1290 ENDPROC
1300 :
1310 DEF PROCrub
1320 IF L% GCOL0,C%:MOVE X%,Y%:DRAW A%,
B%
1330 A%=X%:B%=Y%
1340 ENDPROC
1350 :
1360 DEF PROCcopys
1370 cst%(0)=X%:cst%(1)=Y%
1380 ast%(0)=cx:ast%(1)=cy
1390 VDU 7
1400 ENDPROC
1410 :
1420 DEF PROCdumps
1430 LOCALM%,N%,cx,cy
1440 M%=cst%(0)
1450 N%=cst%(1)
1460 cx=ast%(0)
1470 cy=ast%(1)
1480 FOR Q%=-cy TO cy STEP4
1490 FOR J%=-cx TO cx STEP4
1500 IF POINT(X%+(J%*S%),Y%+(Q%*R%))=0
GCOL0,POINT(M%+J%,N%+Q%):PLOT69,X%+(J%*S
%),Y%+(Q%*R%)
1510 NEXT,
1520 S%=1:R%=1
1530 ENDPROC
1540 :
1550 DEF PROCchng
1560 REPEAT
1570 W%=GET:E%=E%+1
1580 IF W%=48 U%=0
1590 IF W%=49 U%=1
1600 IF W%=50 U%=2
1610 IF W%=51 U%=3
1620 VDU 19,U%,E%;0;
1630 UNTIL W%=13
1640 VDU 19,U%,E%-1;0;
1650 ENDPROC
1660 :
1670 DEF PROCcirc
1680 IF (cx<=0)OR(cy<=0) VDU7:ENDPROC
1690 VDU 29,X%;Y%;
1700 ox=cx
1710 MOVE 0,0
1720 FOR oy=0 TO cy STEP4
1730 ey=oy
1740 ex=cx/cy*SQR(cy*cy-ey*ey)
1750 PLOT 4,ox,oy:PLOTK%,ex,ey
1760 PLOT 4,ox,-oy:PLOTK%,ex,-ey
1770 PLOT 4,-ox,oy:PLOTK%,-ex,ey
1780 PLOT 4,-ox,-oy:PLOTK%,-ex,-ey
1790 oy=ey:ox=ex
1800 NEXT oy
1810 VDU 29,0;0;
1820 ENDPROC
1830 :
1840 DEF PROCspeed
1850 IF INKEY-89 D%=D%+4
1860 IF INKEY-24 D%=4:VDU7
1870 IF INKEY-88 D%=8:VDU7
1880 IF INKEY-73 D%=16:VDU7
1890 IF INKEY-57 AND D%>4 D%=D%-4
1900 ENDPROC
1910 :
1920 DEF PROCcm
1930 IF INKEY-58 Y%=Y%+D%
1940 IF INKEY-42 Y%=Y%-D%
1950 IF INKEY-26 X%=X%-D%
1960 IF INKEY-122 X%=X%+D%
1970 ENDPROC
1980 :
1990 DEF PROCsave
2000 *SAVE WF FFFF3C80 FFFF7D80
2010 ENDPROC
2020 :
2030 DEF PROCload
2040 *LOAD WF FFFF3C80
2050 ENDPROC
2060 :
2070 DEF PROCmenu
2080 LOCAL X%,Y%
2090 FOR Q%=0 TO 27
2100 X%=16+90*(Q% MOD 14)
2110 Y%=878+72*(Q% DIV 14)
2120 GCOL 0,3
2130 MOVE X%,Y%
2140 PLOT 1,0,60:PLOT1,66,0
2150 PLOT 1,0,-60:PLOT1,-66,0
2160 X%=X%+33:Y%=Y%+30
2170 CALL colfill,X%,Y%,Q%
2180 NEXT
2190 GCOL0,3:MOVE 0,866:DRAW 1270,866
2200 DRAW 1270,1022:DRAW 0,1022
2210 DRAW 0,866:PROCbase
2220 ENDPROC
2230 :
2240 DEF PROCellipse
2250 GCOL3,3:F%=FALSE:G%=FALSE:C%=3
2260 PROCms(0,"ELLIPSE")
2270 be=0:end=2*PI
2280 ex=X%:ey=Y%:ecx=cx:ecy=cy:etilt=ti
lt
2290 REPEAT
2300 PROCeldraw(be,end)
2310 ox=X%:oy=Y%:ocx=cx:ocy=cy:otilt=ti
lt
2320 REPEAT
2330 PROCcross:PROCspeed
2340 PROCcm:PROCcheck
2350 IF INKEY-104 cx=cx+4:cy=cy+4
2360 IF INKEY-103 cx=cx-4:cy=cy-4
2370 IF INKEY-66 cy=cy+4
2380 IF INKEY-98 cy=cy-4
2390 IF INKEY-65 tilt=tilt+PI/20
2400 IF INKEY-2 tilt=tilt-PI/20
2410 PROCcross
2420 ox=X%:oy=Y%
2430 ocx=cx:ocy=cy:otilt=tilt
2440 UNTIL(INKEY-74 OR INKEY-99 OR INKE
Y-1)
2450 IF INKEY-1 F%=TRUE
2460 IF INKEY-74 G%=TRUE
2470 PROCeldraw(be,end)
2480 ex=X%:ey=Y%
2490 ecx=cx:ecy=cy:etilt=tilt
2500 UNTIL(F% OR G%)
2510 PROCbase
2520 IF G% GCOL0,7:PROCeldraw(be,end):E
NDPROC
2530 PROCeldraw(be,end)
2540 st=0
2550 PROCsf:st=ang
2560 REPEAT:PROCsf
2570 UNTIL ang>st:fin=ang
2580 PROCeldraw(be,end)
2590 GCOL0,3
2600 PROCeldraw(st,fin)
2610 ENDPROC
2620 :
2630 DEF PROCeldraw(start,stop)
2640 PROCbegin
2650 FOR ang=start TO stop STEP PI/10
2660 PROCcalc
2670 DRAW x,y
2680 NEXT
2690 ENDPROC
2700 :
2710 DEF PROCbegin
2720 sib=SIN(etilt):cob=COS(etilt)
2730 ang=start:PROCcalc
2740 MOVE x,y
2750 ENDPROC
2760 :
2770 DEF PROCcalc
2780 sia=SIN(ang):coa=COS(ang)
2790 x=ex+ecx*coa*cob-ecy*sia*sib
2800 y=ey+ecx*coa*sib+ecy*sia*cob
2810 ENDPROC
2820 :
2830 DEF PROCcross
2840 MOVE ox-ocx*COS(otilt),oy-ocx*SIN(
otilt)
2850 DRAW ox+ocx*COS(otilt),oy+ocx*SIN(
otilt)
2860 MOVE ox-ocy*COS(otilt+PI/2),oy-ocy
*SIN(otilt+PI/2)
2870 DRAW ox+ocy*COS(otilt+PI/2),oy+ocy
*SIN(otilt+PI/2)
2880 ENDPROC
2890 :
2900 DEF PROCsf
2910 PROCbegin
2920 REPEAT
2930 PROCcalc:PROCelcur
2940 IF INKEY-99 ang=ang+PI/10
2950 IF ang>PI*2+st ang=ang-PI*2
2960 PROCelcur
2970 UNTIL INKEY-74
2980 VDU 7
2990 ENDPROC
3000 :
3010 DEF PROCelcur
3020 MOVE x-12,y:DRAW x+12,y
3030 MOVE x,y-12:DRAW x,y+12
3040 ENDPROC
3050 :
3060 DEF PROCerr
3070 IF ERR=17 Z%=1 ELSE PROCms(1,"CHEC
K DISC : PRESS KEY TO CONTINUE")
3080 PROCbase
3090 ENDPROC
3100 :
3110 DEF PROCbase
3120 VDU 26:GCOL0,3
3130 PLOT 4,0,0:PLOT 4,0,28
3140 PLOT 87,1270,28
3150 PLOT 4,1270,0:PLOT 87,0,0
3160 MOVE 0,28:DRAW 1280,28
3170 VDU 24,0;28;1270;860;
3180 GCOL 3,C%
3190 ENDPROC
3200 :
3210 DEF PROCms(W%,mes$)
3220 VDU 26:MOVE 5,24
3230 PRINT;mes$
3240 VDU 24,0;32;1279;860;
3250 IF W% THEN REPEAT UNTIL GET
3260 ENDPROC
3270 :
3280 DEF PROCdel(de)
3290 TIME=0:REPEAT UNTIL TIME=de
3300 ENDPROC
3310 :
3320 DEF PROCair
3330 FOR i%=Y%-cy TO Y%+cy STEP D%
3340 FOR j%=X%-cx TO X%+cx STEP D%
3350 IF RND(10)<5 PLOT 69,j%,i%
3360 NEXT,:ENDPROC
3370 :
3380 DEF PROCdist
3390 IF NOT INKEY-1 A%=X%:B%=Y%:ENDPROC
3400 PROCsavename
```

```
3410 ENDPROC
3420 :
3430 DEF FNinpname
3440 REPEAT
3450 PROCclearbase
3460 VDU 26
3470 MOVE 5,24
3480 INPUT"Filename : "file$
3490 UNTIL LEN(file$)>0 AND LEN(file$)<
8
3500 PROCclearbase
3510 VDU 24,0;32;1279;860;
3520 =file$
3530 :
3540 DEF PROCclearbase
3550 VDU 24,0;0;1279;24;
3560 GCOL 0,128:CLG
3570 VDU 24,0;32;1279;860;
3580 ENDPROC
3590 :
3600 DEF PROCsavename
3610 PROCoscli("SAVE "+FNinpname+" FFFF
3C80 FFFF7D80")
3620 ENDPROC
3630 DEF PROCloadname
3640 PROCoscli("LOAD "+FNinpname+" FFFF
3C80")
3650 ENDPROC
3660 :
3670 DEF PROCoscli($oscli%)
3680 LOCAL X%,Y%
3690 X%=oscli%:Y%=oscli% DIV 256
3700 CALL &FFF7:ENDPROC
3710 :
3720 DEF PROCprinter
3730 REM Here is a screen dump for
3740 REM Epson type printers. Insert
3750 REM your own routine if necessary
3760 :
3770 MOVE0,0:VDU 29,0;0;2,1,27,1,65,1,8
,1,10
3780 FORy%=860TO32STEP-16
3790 VDU 1,27,1,76,1,192,1,3
3800 FOR x%=0 TO 1276 STEP4:A%=0:B%=0
3810 FOR z%=0 TO 12 STEP4
3820 A%=A%*4+3*POINT(x%,y%-z%)
3830 B%=B%*4+3*POINT(x%+2,y%-z%)
3840 NEXT:VDU1,A%,1,A%,1,B%:NEXT
3850 VDU 1,10:NEXT:VDU 1,27,1,64,3
3860 ENDPROC
```

Listing 5

```
10 REM >AutoSource (Po85)
20 REM By David Lawrence
30 REM For BBC B/B+/M/C/E with SWR
40 REM (C) BAU January 1992 & March 1
988
50 :
60 PROCvars
70 PROCass
80 PROCcheck
90 PRINTCHR$13;"Checked O.K."'"Saving
..."
100 OSCLI"*SAVE Autorom "+STR$~code+"
"+STR$~O%+" 8000 8000"
110 END
120 :
130 DEF PROCvars
140 DIM code 2000
150 cr$=CHR$13
160 z$=CHR$0
170 mem=&70:ext=&70
180 len=&70:from=&72
190 to=&74:ptr=&F2
200 err=&100:finfo=&100
210 fname=&112:index=&8800
220 store=&8900
230 oswrch=&FFEE:osnewl=&FFE7
240 osasci=&FFE3:osbyte=&FFF4
250 osfile=&FFDD:osargs=&FFDA
260 osfind=&FFCE:oscli =&FFF7
270 ENDPROC
280 :
290 DEF PROCass
300 FOR pass=4 TO 6 STEP 2
310 P%=&8000:O%=code
320 [OPT pass
330 .start
340 RTS
350 RTS
360 RTS
370 JMP service
380 EQUB 129
390 EQUB copy
400 EQUB 1
410 .title
420 EQUS "Autorom 1.0"+z$
430 .copy
440 EQUS z$+"(C) Acorn User 1988"+z$
450 :
460 .service
470 PHP
480 PHA
490 CMP #9
500 BNE not9
510 JMP help
520 .not9
530 CMP #4
540 BNE not4
550 JMP starcom
560 .not4
570 PLA
580 PLP
590 RTS
600 :
610 .error
620 STX mem
630 STY mem+1
640 LDY #1
650 .xerror
660 LDA (mem),Y
670 STA err,Y
680 INY
690 CMP #0
700 BNE xerror
710 LDA #0
720 STA err
730 JMP err
740 :
750 .mess
760 STX mem
770 STY mem+1
780 LDY #&FF
790 .pmess
800 INY
810 LDA (mem),Y
820 JSR osasci
830 BNE pmess
840 RTS
850 :
860 .loadzero
870 LDX #5
880 .lzero
890 LDA zero,X
900 STA ext,X
910 DEX
920 BPL lzero
930 RTS
940 .savezero
950 LDX #5
960 .szero
970 LDA ext,X
980 STA zero,X
990 DEX
1000 BPL szero
1010 RTS
1020 :
1030 .hex
1040 PHA
1050 LSR A
1060 LSR A
1070 LSR A
1080 LSR A
1090 JSR dig
1100 PLA
1110 AND #&F
1120 .dig
1130 CMP #10
1140 BCC isnum
1150 CLC
1160 ADC #7
1170 .isnum
1180 ADC #48
1190 JMP oswrch
1200 :
1210 .help
1220 TXA
1230 PHA
1240 TYA
1250 PHA
1260 JSR savezero
1270 LDA (ptr),Y
1280 CMP #13
1290 BEQ nonly
1300 LDX #&FF
1310 DEY
1320 .helpl
1330 INX
1340 INY
1350 LDA hword,X
1360 CMP #13
1370 BEQ bighelp
1380 LDA (ptr),Y
1390 CMP #ASC"."
1400 BEQ bighelp
1410 AND #&DF
1420 CMP hword,X
1430 BEQ helpl
1440 .out
1450 JSR loadzero
1460 PLA
1470 TAY
1480 PLA
1490 TAX
1500 PLA
1510 PLP
1520 RTS
1530 .nonly
1540 JSR nameonly
1550 JMP out
1560 :
1570 .bighelp
1580 JSR nameonly
1590 LDX #hlptxt MOD 256
1600 LDY #hlptxt DIV 256
1610 JSR mess
1620 LDA index
1630 BEQ nomore
1640 LDX #fcached MOD 256
1650 LDY #fcached DIV 256
1660 JSR mess
1670 LDX #0
1680 STX tmp
1690 .hloop
1700 LDX tmp
1710 LDA index,X
1720 BEQ hdone
1730 LDY #4
1740 JSR spcs
1750 LDY #8
1760 .names
1770 LDA index,X
1780 BNE notend
1790 LDA #32
1800 .notend
1810 JSR oswrch
1820 INX
1830 DEY
1840 BNE names
1850 LDY #8
1860 JSR spcs
1870 LDA tmp
1880 CLC
1890 ADC #16
1900 STA tmp
1910 BCC hloop
1920 .hdone
1930 LDA #&86
1940 JSR osbyte
1950 CPX #0
1960 BEQ nomore
1970 JSR osnewl
1980 .nomore
1990 JMP out
2000 :
2010 .nameonly
2020 JSR osnewl
2030 LDY #&FF
2040 .pname
2050 INY
2060 LDA title,Y
2070 JSR oswrch
2080 BNE pname
2090 JSR osnewl
2100 RTS
2110 :
2120 .spcs
2130 LDA #32
2140 .spcsl
2150 JSR oswrch
2160 DEY
2170 BNE spcsl
2180 RTS
2190 :
2200 .bmove
2210 LDY #0
2220 .move
2230 LDA len
2240 ORA len+1
2250 BEQ bmoved
2260 LDA (from),Y
2270 STA (to),Y
2280 INC from
2290 BNE notfhi
2300 INC from+1
2310 .notfhi
2320 INC to
2330 BNE notthi
2340 INC to+1
2350 .notthi
2360 DEC len
2370 LDA len
2380 CMP #&FF
2390 BNE move
2400 DEC len+1
2410 LDA len+1
2420 CMP #&FF
2430 BNE move
2440 .bmoved
2450 RTS
2460 :
2470 .starcom
2480 TXA
2490 PHA
2500 TYA
2510 PHA
2520 JSR savezero
2530 LDX #0
2540 STY tmp
2550 .coml
2560 LDA coms,X
2570 CMP #255
2580 BEQ nocom
2590 LDY tmp
2600 .com2
2610 LDA coms,X
2620 BEQ gotcom
2630 LDA (ptr),Y
2640 AND #&DF
2650 CMP coms,X
2660 BNE nextone
2670 INY
2680 INX
2690 BNE com2
2700 .nextone
2710 INX
2720 LDA coms,X
2730 BNE nextone
2740 INX
2750 INX
2760 INX
2770 BNE coml
2780 .gotcom
2790 INX
2800 LDA coms,X
2810 STA mem
2820 LDA coms+1,X
2830 STA mem+1
2840 .movey
2850 LDA (ptr),Y
2860 CMP #13
2870 BEQ ymoved
2880 INY
2890 CMP #32
2900 BEQ movey
2910 DEY
2920 .ymoved
2930 JMP (mem)
2940 :
2950 .nocom
2960 LDX #0
2970 STX ind
2980 .chkind
2990 LDX ind
3000 LDA index,X
3010 BEQ none
3020 LDY tmp
3030 LDA #8
3040 STA count
3050 .cloop
3060 LDA index,X
3070 BEQ gotind
3080 LDA (ptr),Y
3090 AND #&DF
3100 CMP index,X
3110 BNE nextind
3120 INY
3130 INX
3140 DEC count
3150 BNE cloop
3160 .gotind
3170 LDA (ptr),Y
3180 CMP #32
3190 BEQ indok
3200 CMP #13
3210 BEQ indok
3220 .nextind
3230 LDA ind
3240 CLC
3250 ADC #16
3260 STA ind
3270 BCC chkind
3280 .none
3290 JMP out
3300 .indok
3310 LDX ind
3320 LDA index+8,X
3330 STA from
3340 LDA index+9,X
3350 STA from+1
3360 LDA index+10,X
3370 STA to
3380 LDA index+11,X
3390 STA to+1
3400 LDA index+14,X
3410 STA len
3420 LDA index+15,X
3430 STA len+1
3440 JSR bmove
3450 LDA index+12,X
3460 STA jsr+1
3470 LDA index+13,X
3480 STA jsr+2
3490 LDA ptr
3500 STA optr
3510 LDA ptr+1
3520 STA optr+1
3530 LDY #0
3540 .moveptr
3550 INC ptr
3560 BNE notphi
3570 INC ptr+1
3580 .notphi
3590 LDA (ptr),Y
3600 CMP #ASC"*"
3610 BEQ moveptr
3620 CMP #ASC" "
3630 BEQ moveptr
3640 JSR loadzero
3650 PLA
3660 TAY
3670 STY y
3680 PLA
3690 TAX
3700 STX x
3710 PLA
3720 STA a
3730 PLA
3740 STA p
3750 PHA
3760 LDA a
3770 PLP
3780 .jsr
3790 JSR &CAFE
3800 LDA optr
3810 STA ptr
3820 LDA optr+1
3830 STA ptr+1
3840 LDX x
3850 LDY y
3860 LDA p
3870 PHA
3880 LDA #0
3890 PLP
3900 RTS
3910 :
3920 .comout
3930 JSR loadzero
3940 PLA
3950 TAX
3960 PLA
3970 TAX
3980 PLA
3990 LDA #0
4000 PLP
4010 RTS
4020 :
4030 .clear
4040 CMP #13
4050 BNE notclr
4060 LDY #0
4070 TYA
4080 .clrind
4090 STA index,Y
4100 DEY
4110 BNE clrind
4120 LDX #store MOD 256
4130 STX mem
4140 STX index+8
4150 LDX #store DIV 256
4160 STX mem+1
4170 STX index+9
4180 LDA #&C0
4190 SEC
4200 SBC mem+1
```

```
4210 STA memfree+1
4220 LDA #0
4230 STA iptr
4240 STA num
4250 STA memfree
4260 JMP comout
4270 .notclr
4280 JMP out
4290 :
4300 .data
4310 CMP #13
4320 BNE notclr
4330 LDA index
4340 BEQ sdone
4350 LDX #dhead MOD 256
4360 LDY #dhead DIV 256
4370 JSR mess
4380 LDX #0
4390 STX tmp
4400 .snames
4410 LDX tmp
4420 LDA index,X
4430 BEQ sdone
4440 LDY #8
4450 .dloop
4460 LDA index,X
4470 BNE nospc
4480 LDA #32
4490 .nospc
4500 JSR oswrch
4510 INX
4520 DEY
4530 BNE dloop
4540 LDA tmp
4550 CLC
4560 ADC #10
4570 PHA
4580 TAY
4590 JSR pdata
4600 INY
4610 INY
4620 JSR pdata
4630 INY
4640 INY
4650 JSR pdata
4660 PLA
4670 TAY
4680 DEY
4690 DEY
4700 JSR pdata
4710 JSR osnewl
4720 LDA tmp
4730 CLC
4740 ADC #16
4750 STA tmp
4760 BCC snames
4770 .sdone
4780 LDA #ASC"&"
4790 JSR oswrch
4800 LDA memfree+1
4810 JSR hex
4820 LDA memfree
4830 JSR hex
4840 LDX #dfoot MOD 256
4850 LDY #dfoot DIV 256
4860 JSR mess
4870 JMP comout
4880 :
4890 .pdata
4900 LDA #32
4910 JSR oswrch
4920 JSR oswrch
4930 LDA index+1,Y
4940 JSR hex
4950 LDA index,Y
4960 JMP hex
4970 :
4980 .cache
4990 CMP #13
5000 BNE docache
5010 LDX #csyn MOD 256
5020 LDY #csyn DIV 256
5030 JMP error
5040 .docache
5050 LDX #0
5060 .xname
5070 LDA (ptr),Y
5080 STA fname,X
5090 INY
5100 INX
5110 CMP #13
5120 BNE xname
5130 LDX #fname MOD 256
5140 LDY #fname DIV 256
5150 LDA #&40
5160 JSR osfind
5170 CMP #0
5180 BEQ nofile
5190 TAY
5200 LDX #ext
5210 LDA #2
5220 JSR osargs
5230 LDA #0
5240 JSR osfind
5250 LDA num
5260 CMP #16
5270 BEQ noroom
5280 LDA ext+2
5290 ORA ext+3
5300 BNE toobig
5310 LDA ext+1
5320 CMP memfree+1
5330 BCC ok
5340 BNE toobig
5350 LDA ext
5360 CMP memfree
5370 BEQ ok
5380 BCC ok
5390 :
5400 .toobig
5410 LDX #ftb MOD 256
5420 LDY #ftb DIV 256
5430 JMP error
5440 .nofile
5450 LDX #fnf MOD 256
5460 LDY #fnf DIV 256
5470 JMP error
5480 .noroom
5490 LDX #nis MOD 256
5500 LDY #nis DIV 256
5510 JMP error
5520 :
5530 .ok
5540 LDY #&11
5550 LDA #&FF
5560 .clrblk
5570 STA finfo,Y
5580 DEY
5590 BNE clrblk
5600 LDA #fname MOD 256
5610 STA finfo
5620 LDA #fname DIV 256
5630 STA finfo+1
5640 LDX #finfo MOD 256
5650 LDY #finfo DIV 256
5660 LDA #&FF
5670 JSR osfile
5680 LDY iptr
5690 LDA finfo+2
5700 STA from
5710 STA index+10,Y
5720 LDA finfo+3
5730 STA from+1
5740 STA index+11,Y
5750 LDA index+8,Y
5760 STA to
5770 LDA index+9,Y
5780 STA to+1
5790 LDA finfo+6
5800 STA index+12,Y
5810 LDA finfo+7
5820 STA index+13,Y
5830 LDA ext
5840 STA index+14,Y
5850 LDA ext+1
5860 STA index+15,Y
5870 LDA memfree
5880 SEC
5890 SBC len
5900 STA memfree
5910 LDA memfree+1
5920 SBC len+1
5930 STA memfree+1
5940 JSR bmove
5950 LDX #0
5960 .fret
5970 INX
5980 LDA fname,X
5990 CMP #32
6000 BEQ ndot
6010 CMP #13
6020 BNE fret
6030 .ndot
6040 DEX
6050 BEQ gotit
6060 LDA fname,X
6070 CMP #ASC"."
6080 BNE ndot
6090 INX
6100 .gotit
6110 LDY #8
6120 STY tmp
6130 LDY iptr
6140 .mname
6150 LDA fname,X
6160 CMP #32
6170 BEQ mndone
6180 CMP #13
6190 BEQ mndone
6200 STA index,Y
6210 INX
6220 INY
6230 DEC tmp
6240 BNE mname
6250 .mndone
6260 LDA num
6270 CMP #15
6280 BEQ noinc
6290 LDA iptr
6300 CLC
6310 ADC #16
6320 STA iptr
6330 TAY
6340 LDA to
6350 STA index+8,Y
6360 LDA to+1
6370 STA index+9,Y
6380 .noinc
6390 INC num
6400 JMP comout
6410 :
6420 .scrap
6430 CMP #13
6440 BNE doscrap
6450 LDX #ssyn MOD 256
6460 LDY #ssyn DIV 256
6470 JMP error
6480 .doscrap
6490 LDX #0
6500 .scrap1
6510 LDA (ptr),Y
6520 STA fname,X
6530 CMP #13
6540 BEQ eoc
6550 CMP #32
6560 BEQ eoc
6570 INY
6580 INX
6590 CPX #8
6600 BNE scrap1
6610 JMP nofile
6620 .eoc
6630 LDX #0
6640 STX tmp
6650 .fscrap
6660 LDX tmp
6670 LDA index,X
6680 BEQ notthere
6690 LDY #0
6700 LDA #8
6710 STA count
6720 .comploop
6730 LDA index,X
6740 BEQ comped
6750 CMP fname,Y
6760 BNE ncomp
6770 INX
6780 INY
6790 DEC count
6800 BNE comploop
6810 .notthere
6820 JMP nofile
6830 :
6840 .ncomp
6850 LDA tmp
6860 CLC
6870 ADC #16
6880 STA tmp
6890 BCC fscrap
6900 JMP nofile
6910 .comped
6920 LDA fname,Y
6930 CMP #32
6940 BEQ compok
6950 CMP #13
6960 BNE ncomp
6970 :
6980 .compok
6990 LDX tmp
7000 LDA index+14,X
7010 STA len
7020 LDA index+15,X
7030 STA len+1
7040 CPX #&F0
7050 BEQ justdel
7060 LDA index+8,X
7070 STA to
7080 LDA index+9,X
7090 STA to+1
7100 LDA index+24,X
7110 STA from
7120 LDA index+25,X
7130 STA from+1
7140 LDY #0
7150 .shuffle
7160 LDA (from),Y
7170 STA (to),Y
7180 INC to
7190 BNE shuf1
7200 INC to+1
7210 .shuf1
7220 INC from
7230 BNE shuffle
7240 INC from+1
7250 LDA from+1
7260 CMP #&C0
7270 BNE shuffle
7280 LDA tmp
7290 TAX
7300 CLC
7310 ADC #16
7320 TAY
7330 .shufind
7340 LDA index,Y
7350 STA index,X
7360 INX
7370 INY
7380 BNE shufind
7390 LDX tmp
7400 .sublen
7410 LDA index+8,X
7420 SEC
7430 SBC len
7440 STA index+8,X
7450 LDA index+9,X
7460 SBC len+1
7470 STA index+9,X
7480 TXA
7490 CLC
7500 ADC #16
7510 TAX
7520 BCC sublen
7530 LDA num
7540 CMP #16
7550 BEQ justdel
7560 LDA iptr
7570 SEC
7580 SBC #16
7590 STA iptr
7600 .justdel
7610 DEC num
7620 LDA memfree
7630 CLC
7640 ADC len
7650 STA memfree
7660 LDA memfree+1
7670 ADC len+1
7680 STA memfree+1
7690 LDA #0
7700 LDY #&F0
7710 .deloop
7720 CPY #&F8
7730 BNE noiny
7740 INY
7750 INY
7760 .noiny
7770 STA index,Y
7780 INY
7790 BNE deloop
7800 JMP comout
7810 :
7820 .hlptxt  EQUS "  Commands:"+cr$
7830          EQUS "    *CACHE <file>"+cr$
7840          EQUS "    *SCRAP <file>"+cr$
7850          EQUS "    *CLEAR"+cr$
7860          EQUS "    *DATA"+cr$
7870          EQUB 0
7880 .fcached EQUS "  Files cached:"+cr$+z$
7890 .dhead   EQUS "Filename  Load  Exec  Size  Addr"+cr$+z$
7900 .dfoot   EQUS " bytes free."+cr$+z$
7910 .fnf     BRK:EQUB 255:EQUS "File not found"+z$
7920 .ftb     BRK:EQUB 254:EQUS "File too big"+z$
7930 .nis     BRK:EQUB 253:EQUS "No room in index"+z$
7940 .csyn    BRK:EQUB 252:EQUS "Syntax: *CACHE <file>"+z$
7950 .ssyn    BRK:EQUB 251:EQUS "Syntax: *SCRAP <file>"+z$
7960 .hword   EQUS "AUTOROM"+cr$
7970 .coms    EQUS "CACHE"+z$ : EQUW cache
7980          EQUS "SCRAP"+z$ : EQUW scrap
7990          EQUS "CLEAR"+z$ : EQUW clear
8000          EQUS "DATA"+z$  : EQUW data
8010          EQUB -1
8020 .zero    EQUD 0
8030          EQUW 0
8040 .tmp     EQUB 0
8050 .memfree EQUW 0
8060 .iptr    EQUB 0
8070 .num     EQUB 0
8080 .count   EQUB 0
8090 .ind     EQUB 0
8100 .a       EQUB 0
8110 .x       EQUB 0
8120 .y       EQUB 0
8130 .p       EQUB 0
8140 .optr    EQUW 0
8150 .end     EQUB 0
8160 ]NEXT
8170 ENDPROC
8180 :
8190 DEF PROCcheck
8200 PRINT "Checking...";
8210 PROCsum("start","out",20044)
8220 PROCsum("out","bmove",16661)
8230 PROCsum("bmove","gotind",23629)
8240 PROCsum("gotind","data",28004)
8250 PROCsum("data","toobig",26887)
8260 PROCsum("toobig","scrap",24762)
8270 PROCsum("scrap","shufind",21955)
8280 PROCsum("shufind","hlptxt",12223)
8290 PROCsum("hlptxt","end",20901)
8300 ENDPROC
8310 :
8320 DEF PROCsum(S$,E$,N%)
8330 T%=0
8340 FOR I%=EVAL(S$)-P%+O% TO EVAL(E$)-P%+O%-1
8350 T%=T%+?I%:NEXT
8360 IF T%=N% ENDPROC
8370 PRINT "Please check from ";S$;" to ";E$;"."
```

Listing 6

```
   10 REM >StarCheck (Po86)
   20 REM By David Lawrence
   30 REM For BBC B/B+/M/C/E
   40 REM (C) BAU January 1992 & March 1988
   50 :
   60 PROCassemble
   70 PRINT"Saving *Check..."
   80 OSCLI"Save Check "+STR$~code+" "+STR$~O%+" 900 900"
   90 END
  100 :
  110 DEF PROCassemble
  120 DIM code 256
  130 FOR pass=4 TO 6 STEP 2
  140 P%=&900:O%=code
  150 [OPT pass
  160 .skipto
  170 INY
  180 LDA (&F2),Y
  190 CMP #13
  200 BEQ eoc
  210 CMP #32
  220 BNE skipto
  230 .skipover
  240 INY
  250 LDA (&F2),Y
  260 CMP #13
  270 BEQ eoc
  280 CMP #32
  290 BEQ skipover
  300 BNE notspc
  310 .eoc
  320 BRK:BRK
  330 EQUS "*CHECK <word>"
  340 EQUB 13:BRK
  350 .notspc
  360 LDX #0
  370 .move
  380 LDA (&F2),Y
```




```
390 STA word,X
400 INY:INX
410 CMP #13
420 BNE move
430 LDY #0
440 DEX
450 DEX
460 .compare
470 LDA word,X
480 CMP word,Y
490 BNE notsame
500 INY
510 DEX
520 BNE compare
530 BRK:BRK
540 EQUS "Palindrome"
550 EQUB 13:BRK
560 .notsame
570 BRK:BRK
580 EQUS "Not Palindrome"
590 EQUB 13:BRK
600 RTS
610 .word
620 BRK
630 ]NEXT
640 T%=0
650 FOR I%=code TO O%-1
660 T%=T%+?I%
670 NEXT
680 IF T%<>11553 PRINT "Checksum error
":END
690 ENDPROC
```

Listing 7

```
10 REM >StarPhone (Po87)
20 REM By David Lawrence
30 REM For BBC B/B+/M/C/E
40 REM (C) BAU January 1992 & March 1
988
50 :
60 DIM code 100
70 mem%=code
80 FOR num%=1 TO 9
90 READ hex$,sum%
100 tot%=0
110 REPEAT
120 val%=EVAL("&"+LEFT$(hex$,2))
130 ?mem%=val%
140 mem%=mem%+1
150 tot%=tot%+val%
160 hex$=MID$(hex$,3)
170 UNTIL hex$=""
180 IF tot%<>sum% PRINT "Error in line
";num%:END
190 NEXT num%
200 PRINT"Saving *Phone..."
210 OSCLI"Save Phone "+STR$~code+" "+S
TR$~mem%+" 900 900"
220 END
230 :
240 DATA A239A009A90820F1FFA905,1267
250 DATA 8D3809A247A009A90720F1,1057
260 DATA FFA24FA009A90720F1FFA2,1531
270 DATA 47A009A90720F1FFA257A0,1353
280 DATA 09A90720F1FFCE3809D0D7,1407
290 DATA 60000103F60A000101007F,485
300 DATA F6F6FF7F0A01000100A500,1051
310 DATA 09000100000000000060001,17
320 DATA 000000000023,35
```

Sprite Editor

Listing 1

```
10 REM >MakeSprEd (SprED1)
20 REM by Ian Wilson
30 REM for Arc only
40 REM (c) BAU Jan 91
50 :
60 ON ERROR PROCerror
70 :
80 *CDIR "!SprEd"
90 *DIR "!SprEd"
100 PROCdatafile("!Sprites",780,&FF9)
110 PROCdatafile("Templates",1550,&FEC
)
120 PROCtextfile("!Boot",630,&FEB)
130 PROCtextfile("!Run",670,&FEB)
140 *DIR ^
150 END
160 :
170 DEF PROCdatafile(fname$,restore%,t
ype%)
180 RESTORE restore%
190 acc%=0
200 line%=0
210 out%=OPENOUT fname$
220 REPEAT
230 line%+=10
240 READ inp$
250 IF inp$<>"end" THEN
260 i%=1
270 REPEAT
280 byte%=EVAL("&"+MID$(inp$,i%,2))
290 BPUT# out%,byte%
300 i%+=2
310 acc%+=byte%
320 UNTIL MID$(inp$,i%,1)="/"
330 check%=EVAL("&"+MID$(inp$,i%+1,2))
340 IF check%<>acc% MOD 256 THEN PRINT
 "Checksum error at line "STR$(restore%+
line%-10) : END
350 ENDIF
360 UNTIL inp$="end"
370 CLOSE# out%
380 SYS "OS_File",18,fname$,type%
390 ENDPROC
400 :
410 DEF PROCtextfile(fname$,restore%,t
ype%)
420 RESTORE restore%
430 out%=OPENOUT fname$
440 REPEAT
450 READ inp$
460 IF inp$<>"end" THEN
470 FOR i%= 1 TO LEN(inp$)
480 BPUT# out%,ASC(MID$(inp$,i%,1))
490 NEXT
500 BPUT# out%,10
510 ENDIF
520 UNTIL inp$="end"
530 CLOSE# out%
540 SYS "OS_File",18,fname$,type%
550 ENDPROC
560 :
570 DEF PROCerror
580 PRINT REPORT$+" at line "STR$(ERL)
590 *DIR ^
600 END
610 ENDPROC
620 :
630 REM data for Boot File
640 DATA "IconSprites <Obey$Dir>.!SPRI
TES"
650 DATA "end"
660 :
670 REM data for Run File
680 DATA "|> !Run"
690 DATA "|>Run file for SprEd"
700 DATA "|By Ian Wilson © BBC Acorn U
ser"
710 DADA "IF "<System$Path>"="" then e
rror 0 System resources not found"
720 DATA "RMEnsure ColourTrans 0.00 RM
Load System:Modules.Colours"
730 DATA "Set SprEd$dir <Obey$Dir>"
740 DATA "Wimpslot -min 48k -max 48k"
750 DATA "<Obey$Dir>.!RunImage"
760 DATA "end"
770 :
780 REM data for sprites
790 DATA 0100000010000000E402/F7
800 DATA 0000D40200002173707 2/43
810 DATA 6564000000000000400/10
820 DATA 00001000000000000000/20
830 DATA 070000002C0000008001/D4
840 DATA 00000C0000007777777 7/BC
850 DATA 7777777777777070000/4
860 DATA 0000000000007799FFFF/12
870 DATA FFFFFF0000007007 0000/86
880 DATA 00000000000077FFFFFF/FA
890 DATA BFFF0F7077077007 0000/2C
900 DATA 00000000000077FFFFBF/60
910 DATA BBBB007772077007 0000/3D
920 DATA 00000000000077FFFFFF/B1
930 DATA EEEE707777007007 0000/62
940 DATA 00000000000077FFFFFF/D6
950 DATA 8E7E7777777777777777/9A
960 DATA 7777770000077AAAAAA/74
970 DATA EE7E97F9FFFFFFFF0F00/7B
980 DATA 00007700000077AAAAAA/67
990 DATA AA7AF7FFFFFFFBFF0077/F0
1000 DATA 77007700000077AAAAAA/53
1010 DATA AA7AF7FFFFBBBB0B7027/84
1020 DATA 77007700000077AAAAAA/E7
1030 DATA AA7AF7FFFFEFEE0E7777/D9
1040 DATA 07007700000077AAAAAA/CC
1050 DATA AA70F7FFFFEFE80E7077/A7
1060 DATA 00007700000077777777/FA
1070 DATA 7777A7AAAAEAEE0E3013/C
1080 DATA 00007700000000000000/83
1090 DATA 0070A7AAAAAAAA0070BB/6D
1100 DATA 00007700000000000000/E4
1110 DATA 0070A7AAAAAAAA0070BB/CE
1120 DATA 00007700000000000000/45
1130 DATA 0070A7AAAAAAAA00B0EB/9F
1140 DATA 00007700000000000000/16
1150 DATA 0070A7AAAAAA0A00B0EB/D0
1160 DATA 00007700000000000000/47
1170 DATA 00707777777777777777/6F
1180 DATA 777777000000FFFFFFFF/D0
1190 DATA FFFFFFFFFFFFFF0F0000/D8
1200 DATA 000000FFFFFFFFFFFFFF/D1
1210 DATA FFFFFFFFFFFFFF0F0000/D9
1220 DATA 000000FFFFFFFFFFFFFF/D2
1230 DATA FFFFFFFFFFFFFF0F0000/DA
1240 DATA 000000FFFFFFFFFFFFFF/D3
1250 DATA FFFFFFFFFFFFFF0F0000/DB
1260 DATA 000000FFFFFFFFFFFFFF/D4
1270 DATA FFFFFFFFFFFF0F000000/DD
1280 DATA 000000FFFFFFFFFFFFFF/D6
1290 DATA FFFFFFFFFFFFFFFFFFFF/CC
1300 DATA FFFFFFFFFFFFFFFFFFFF/C2
1310 DATA FFFFFFFFFFFFFFFFFFFF/B8
1320 DATA FFFFFFFFFFFFFFFFFFFF/AE
1330 DATA FFFFFFFFFFFFFFFFFFFF/A4
1340 DATA FFFFFFFFFFFFFFFFFFFF/9A
1350 DATA FFFFFFFFFFFFFFFFFFFF/90
1360 DATA FFFFFFFFFFFFFFFFFFFF/86
1370 DATA FFFFFFFFFFFFFFFFFFFF/7C
1380 DATA FFFFFFFFFFFFFFFFFFFF/72
1390 DATA FFFFFFFFFFFFFFFFFFFF/68
1400 DATA FFFFFFFFFFFFFFFFFFFF/5E
1410 DATA 0FF0FFFFFFFFFFFFFFFF/55
1420 DATA FFFFFFFFFFFF00000000/4F
1430 DATA 00F0FFFFFFFFFFFFFFFF/37
1440 DATA FFFFFFFFFFFF00000000/31
1450 DATA 00F0FFFFFFFFFFFFFFFF/19
1460 DATA FFFFFFFFFFFF00000000/13
1470 DATA 00F0FFFFFFFFFFFFFFFF/FB
1480 DATA FFFFFFFFFFFF00000000/F5
1490 DATA 00F0FFFFFFFFFFFFFFFF/DD
1500 DATA FFFFFFFFFFFF00000000/D7
1510 DATA 00F0FFFFFFFFFFFFFFFF/BF
1520 DATA FFFFFFFFFFFF/B9
1530 DATA end
1540 :
1550 REM data for templates
1560 DATA FFFFFFFF000000000000/FC
1570 DATA 00000000000044000000/40
1580 DATA 8D010000010000000696E/A6
1590 DATA 666F0D00000000000000/88
1600 DATA D10100004E0600000100/AF
1610 DATA 00006564697 40D000000/62
1620 DATA 0000000000000000F201/55
1630 DATA 0000B402000062040000/71
1640 DATA AC030000000000000000/20
1650 DATA 00006407000012000584/26
1660 DATA 07020701030 10C000000/47
1670 DATA 000008FFFFFF70020000/BE
1680 DATA 000000003D0100000030/2C
1690 DATA 00000100000000000000/2D
1700 DATA 58010000FFFFFFFF1300/95
1710 DATA 000008000000 7A000000/17
1720 DATA C0FFFFFFD0000000ECFF/8F
1730 DATA FFFF196000C74E616D65/4E
1740 DATA 0D746C65643E0D7F4E00/1C
1750 DATA 000088FFFFFFCA000000/6B
1760 DATA BCFFFFFF196000C75075/29
1770 DATA 72706F73650D643E0D7F/8D
1780 DATA 1C0000050FFFFFFC800/BE
1790 DATA 000080FFFFFF196000C7/7B
1800 DATA 577269747465 6E206279/63
1810 DATA 0D7F4A00000018FFFFFF/4E
1820 DATA C60000004CFFFFFF1960/D6
1830 DATA 00C756657273696F6E0D/90
1840 DATA 643E0D7FD0000000C0FF/4D
1850 DATA FFFF50020000F0FFFFFF/8A
1860 DATA 3D60000753707245640D/19
1870 DATA 6C65643E0D7FD0000000/E8
1880 DATA 88FFFFFF50020000B8FF/76
1890 DATA FFFF3D6100076B010000/85
1900 DATA FFFFFFFF11000000D000/62
1910 DATA 000050FFFFFF52020000/3
1920 DATA 80FFFFFF3D6100077C01/A2
1930 DATA 0000FFFFFFFF0D000000/AB
1940 DATA D00000018FFFFFF5202/E4
1950 DATA 000048FFFFFF3D610007/CE
1960 DATA 89010000FFFFFFFF0C00/60
1970 DATA 000041626F7574205468/37
1980 DATA 69732050726F6772616D/B
1990 DATA 0D4564697420537072 69/5C
2000 DATA 7465204D6F64650D4961/91
2010 DATA 6E2057696C736F6E20A9/64
2020 DATA 0D312E310D7600000090/14
2030 DATA 000000A0040000B00200/6A
2040 DATA 0000000000000000004C/B6
2050 DATA 07000012000587070207/6B
2060 DATA 0103010C0000000000E0/5C
2070 DATA FDFFFF2A040000000000/85
2080 DATA 003D00000000030000001/F3
2090 DATA 00000000000000537072/28
2100 DATA 45640D6C65643E0D652D/F0
2110 DATA 0000005C000000C8FFFF/12
2120 DATA FF0C010000F8FFFFFF19/2C
2130 DATA 6000C7537072697 46573/3D
2140 DATA 20496E0D7F3C00000080/5C
2150 DATA FFFFFF88000000B0FFFF/8F
2160 DATA FF196000C74D6F64650D/60
2170 DATA 746C65643E0D7F9C0000/6F
2180 DATA 0084FFFFFF4C010000B4/F1
2190 DATA FFFFFF3D610007F80500/90
2200 DATA 00FFFFFFFF0500000018/A9
2210 DATA 0000004 0FFFFFF840000/6A
2220 DATA 0070FFFFFF196000C758/6F
2230 DATA 2073697A650D65643E0D/6B
2240 DATA 7F9A00000044FFFFFF4A/F
2250 DATA 01000074FFFFFF3D6100/1F
2260 DATA 07FB050000FFFFFFFF06/28
2270 DATA 0000001A00000000FFFF/40
2280 DATA FF8600000028FFFFFF19/3
2290 DATA 6000C7592073697A650D/6B
2300 DATA 65643E0D7F9A00000000/98
2310 DATA FFFFFF4A01000030FFFF/E
2320 DATA FF3D61000700060000FF/B7
2330 DATA FFFFFF06000000790100/34
2340 DATA 008CFEFFFF7A010000E0/17
2350 DATA FFFFFF386000770D556E/F3
2360 DATA 7469746C65643E0D7F70/B3
2370 DATA 020000C8FFFFFF2C0300/A9
2380 DATA 00F8FFFFFF196000C753/31
2390 DATA 707269746573204F7574/20
2400 DATA 0DC00100080FFFFFF0C/77
2410 DATA 020000B0FFFFFF196000/9F
2420 DATA C74D6F64650D746C6564/A1
2430 DATA 3E0D7FA401000040FFFF/4E
2440 DATA FF100200070FFFFFF19/E5
2450 DATA 6000C7582073697A650D/4C
2460 DATA 65643E0D7FA001000004/84
2470 DATA FFFFFF0C0200002CFFFF/B9
2480 DATA FF196000C7592073697A/C7
2490 DATA 650D65643E0D7F1C0200/EA
2500 DATA 0080FFFFFFCC020000B0/E5
2510 DATA FFFFFF3DF10007040600/21
2520 DATA 00FFFFFFFF030000001C/3C
2530 DATA 0200004 0FFFFFFCC0200/49
2540 DATA 0070FFFFFF3D61000707/62
2550 DATA 060000FFFFFFFF060000/6A
2560 DATA 001E02000000FFFFFFCE/55
2570 DATA 02000030FFFFFF3D6100/22
2580 DATA 070C060000FFFFFFFF06/3D
2590 DATA 0000009A01000094FEFF/69
2600 DATA FF36020000C4FEFFFF19/79
2610 DATA 6000C75361766520 4173/3
2620 DATA 203A0D0D7FD202000094/5E
2630 DATA FEFFFF1A040000C4FEFF/39
2640 DATA FF3DF10007100600001B/9E
2650 DATA 0600004000000780200/5E
2660 DATA 00F4FDFFFFBC02000038/43
2670 DATA FEFFFF3E6000C766696C/DF
2680 DATA 655F6666390D3E0D7F06/85
2690 DATA 0000009CFEFFFF920000/AF
2700 DATA 00CCFEFFFF196000C746/FD
2710 DATA 696C656E616D650D3E0D/30
2720 DATA 7F980000009CFEFFFF48/27
2730 DATA 010000CCFEFFFF356300/88
2740 DATA 071F0600002A06000040/24
2750 DATA 000000E602000040FFFF/4A
2760 DATA FF140300070FFFFFF3D/A
2770 DATA 6000078B0D6E7469746C/34
2780 DATA 65643E0D7F1403000040/1E
2790 DATA FFFFFF400300070FFFF/CC
2800 DATA FF3D6000078A0D6E7469/51
2810 DATA 746C65643E0D7FC40300/8B
2820 DATA 0040FFFFFF203000070/2D
2830 DATA FFFFFF3D6000078B0D6E/D4
2840 DATA 7469746C65643E0D7FF2/16
2850 DATA 03000040FFFFFF1E0400/78
2860 DATA 0070FFFFFF3D6000078A/13
2870 DATA 0D6E7469746C65643E0D/5F
2880 DATA 7FE602000000FFFFFF14/D7
2890 DATA 03000030FFFFFF3D6000/A4
2900 DATA 078B0D6E7469746C6564/37
2910 DATA 3E0D7F1403000000FFFF/16
2920 DATA FF4003000030FFFFFF3D/C2
2930 DATA 6000078A0D6E7469746C/EB
2940 DATA 65643E0D7FC403000000/45
2950 DATA FFFFFFF20300030FFFF/65
2960 DATA FF3D6000078B0D6E7469/EB
2970 DATA 746C65643E0D7FF20300/53
2980 DATA 0000FFFFFF1E04000030/A2
2990 DATA FFFFFF3D6000078A0D6E/48
3000 DATA 7469746C65643E0D7F50/E8
3010 DATA 03000040FFFFFF760300/A1
3020 DATA 006CFFFFFF196100C72E/79
3030 DATA 060000FFFFFFFF040000/7F
3040 DATA 009003000040FFFFFFB6/5
3050 DATA 0300006CFFFFFF196100/EB
3060 DATA C730060000FFFFFFFF04/E8
3070 DATA 000000520300000 0FFFF/3B
3080 DATA FF780300002CFFFFFF19/F7
3090 DATA 6100C73206 0000FFFFFF/54
3100 DATA FF040000009203000000/EC
3110 DATA FFFFFFB80300002CFFFF/CE
3120 DATA FF196100C734060000FF/47
3130 DATA FFFFFF0400000740300/BF
3140 DATA 0040FFFFFF9003000070/FF
3150 DATA FFFFFF196000C73A0D6E/F1
3160 DATA 7469746C65643E0D7F74/B5
3170 DATA 03000000FFFFFF900300/48
3180 DATA 0030FFFFFF196000C73A/EF
3190 DATA 0D6E7469746C65643E0D/3B
3200 DATA 7F0C00000044FEFFFFA8/AE
3210 DATA 00000074FEFFFF196000/97
3220 DATA C7537072697465204E6F/B2
3230 DATA 0D0D7FA400000044FEFF/30
3240 DATA FFEA00000074FEFFFF19/A2
3250 DATA 6100C736060000FFFFFF/3
3260 DATA FF03000000EC00000048/39
3270 DATA FEFFFF1A01000078FEFF/C5
3280 DATA FF3D6000078B0D6E7469/4B
3290 DATA 746C65643E0D7F180100/D7
3300 DATA 0048FEFFFF4401000078/D8
3310 DATA FEFFFF3D6000078A0D6E/7D
3320 DATA 7469746C65643E0D7F36/3
3330 DATA 000000F4FDFFFF820000/74
3340 DATA 0028FEFFFF196000C74E/26
3350 DATA 616D650D616D650D3E0D/F1
3360 DATA 7F98000000F8FDFFFF48/43
3370 DATA 01000028FEFFFF3D6100/6
3380 DATA 073806 0000FFFFFFFF0C/53
3390 DATA 000000D002000054FEFF/76
3400 DATA FFA203000084FEFFFF3D/D7
3410 DATA F1000743060000FFFFFF/15
3420 DATA FF0C00000038020000 94/EE
3430 DATA FEFFFFC4020000C4FEFF/71
3440 DATA FF196000C746696C656E/9E
3450 DATA 616D650D3E0D7F720100/1B
3460 DATA 00E8FDFFFF7A010000F8/71
3470 DATA FFFFFF1C6000C73C556E/B0
3480 DATA 7469746C65643E0D7F06/6
3490 DATA 02000054FEFFFFC20200/1C
3500 DATA 0084FEFFFF196000C753/2F
3510 DATA 707269746520 4E616D65/F4
3520 DATA 0DD0020000FCFDFFFFFE/C8
3530 DATA 0200002CFEFFFF3D9001/C0
3540 DATA C74F4B0D7469746C6564/B4
3550 DATA 3E0D7F32310D31303236/B7
3560 DATA 0D3936300D32310D3130/41
3570 DATA 32360D3936300D3C556E/61
3580 DATA 7469746C65643E0D417E/F1
3590 DATA 200D3C556E7469746C65/3F
3600 DATA 643E0D417E200D310D31/49
3610 DATA 0D310D310D310D3C556E/F
3620 DATA 7469746C65643E0D3C55/71
3630 DATA 6E7469746C65643E0D/B0
3640 DATA end
```

Listing 2

```
10 REM >!RunImage (SprED2)
20 REM by Ian Wilson
30 REM for Arc only
40 REM (c) BAU Jan 92
50 :
60 ON ERROR PROCerror
70 DIM q% &800
80 DIM block% &1000
90 DIM pointer% 64
```

```
100 DIM menu% 100,cmenu% 200
110 DIM useful% 100
120 DIM savename% 64
130 DIM tintpal% 64
140 DIM temppal% 256
150 DIM palette% 256
160 heap%=0:end%=FALSE
170 sent%=FALSE:waitingfortransfer%=FA
LSE
180 quicksave%=0:xmantissa%=1
190 xdivisor%=1:ymantissa%=1
200 ydivisor%=1:xout%=1026
210 yout%=960:desktopcol%=3
220 spriteloaded%=FALSE
230 scrap$="<Wimp$Scrap>"
240 newsprite$="Newsprite"
250 PROCinit:PROCpalette
260 PROCwindows:PROCcreatemenu
270 PROCmain:PROCfinish
280 :
290 DEF PROCmain
300 REPEAT
310 PROCpoll
320 UNTIL end%=TRUE
330 ENDPROC
340 :
350 DEF PROCfinish
360 SYS "Wimp_CloseDown",task%,"TASK"
370 END
380 ENDPROC
390 :
400 DEF PROCerror
410 SYS "Wimp_ClaimFreeMemory",0
420 CASE ERR OF
430 WHEN 1800 :PROCtellemoff("Unsuitab
le sprite mode") : PROCmain : PROCfinish
440 WHEN 67797 :PROCtellemoff("Disc no
t present") : PROCmain : PROCfinish
450 WHEN 17 :PROCtellemoff("Sprite con
version aborted"): PROCmain : PROCfinish
460 OTHERWISE
470 !block%=ERR
480 $(block%+4)="Internal error number
 "+STR$(ERR)+"   '"+REPORT$+"' at line "
+STR$(ERL)
490 SYS "Wimp_ReportError",block%,1,"S
prEd"
500 PROCfinish
510 ENDCASE
520 ENDPROC
530 :
540 DEF PROCtellemoff(er$)
550 !useful%=0
560 $(useful%+4)=er$+CHR$(0)
570 SYS "Wimp_ReportError",useful%,1,"
SprEd"
580 ENDPROC
590 :
600 DEF PROCinit
610 DIM icon% 10
620 $icon%="TASK"+CHR$(0)
630 SYS "Wimp_Initialise",200,!icon%,"
SprEd" TO,task%
640 $icon%="!SprEd"+CHR$(0)
650 !q%=-1
660 q%!4=0      :q%!8=0
670 q%!12=70    :q%!16=64
680 q%!20=&2102:q%!24=icon%
690 q%!28=1     :q%!32=8
700 SYS "Wimp_CreateIcon",,q%
710 ENDPROC
720 :
730 DEF PROCwindows
740 DIM mainw% &1528, infow% &360
750 DIM indirmain% &260, indirinfo% &4
8
760 SYS "Wimp_OpenTemplate",,"<SprEd$D
ir>.Templates"
770 SYS "Wimp_LoadTemplate",,mainw%,in
dirmain%,indirmain%+&1000,-1,"edit",0
780 SYS "Wimp_LoadTemplate",,infow%,in
dirinfo%,indirinfo%+&100,-1,"info",0
790 SYS "Wimp_CreateWindow",,mainw% TO
 edit%
800 SYS "Wimp_CreateWindow",,infow% TO
 info%
810 SYS "Wimp_CloseTemplate"
820 loadnameaddr%=FNfindaddress(19)
830 savenameaddr%=FNfindaddress(16)
840 ENDPROC
850 :
860 DEFFNfindaddress(icon%)
870 !q%=edit%
880 q%!4=icon%
890 SYS "Wimp_GetIconState",,q%
900 =q%!28
910 :
920 DEF PROCpalette
930 DIM table% 256
940 FOR i%=0 TO 148 STEP 4
950 READ entry%
960 table%!i%=entry%
970 NEXT
980 DATA &FFFFFF10,&DDDDDD10,&BBBBBB10
,&99999910,&77777710,&55555510
990 DATA &33333310,&10,&99440010,&EEEE
10,&CC0010,&DD10,&BBEEEE10,&885510
1000 DATA &BBFF10,&FFBB0010
1010 DATA 0,&FF01,&FF0002,&FFFF03,&FF00
0004,&FF00FF05,&FFFF0006,&FFFFFF07
1020 DATA 8,&FF09,&FF000A,&FFFF0B,&FF00
000C,&FF00FF0D,&FFFF000E,&FFFFFF0F
1030 DATA &FFFFFF10,&BBBBBB10,&77777710
,&10
1040 DATA &FFFFFF10,&10
1050 ENDPROC
1060 :
1070 DEF PROCcreatemenu
1080 $menu%="SprEd"
1090 menu%?12=7:menu%?13=2
1100 menu%?14=7:menu%?15=0
1110 menu%!16=140:menu%!20=44
1120 menu%!24=0:menu%!28=0
1130 menu%!32=0:menu%!36=&7000021
1140 $(menu%+40)="Clear"+CHR$(0)
1150 menu%!52=0
1160 menu%!56=info%
1170 menu%!60=&7000021
1180 $(menu%+64)="Info"+CHR$(0)
1190 menu%!76=&80
1200 menu%!80=0
1210 menu%!84=&7000021
1220 $(menu%+88)="Quit"+CHR$(0)
1230 :
1240 $cmenu%="Colours"
1250 cmenu%?12=7:cmenu%?13=2
1260 cmenu%?14=7:cmenu%?15=0
1270 cmenu%!16=340:cmenu%!20=44
1280 cmenu%!24=0:cmenu%!28=0
1290 cmenu%!32=0:cmenu%!36=&7000121
1300 DIM cmenu%!40 20
1310 $(cmenu%!40)="Desktop to actual"+C
HR$(0)
1320 cmenu%!44=0:cmenu%!48=20
1330 cmenu%!52=0:cmenu%!56=0
1340 cmenu%!60=&7000121
1350 DIM cmenu%!64 20
1360 $(cmenu%!64)="Actual to desktop"+C
HR$(0)
1370 cmenu%!68=0:cmenu%!72=20
1380 cmenu%!76=0:cmenu%!80=0
1390 cmenu%!84=&7000121
1400 DIM cmenu%!88 20
1410 $(cmenu%!88)="Actual to actual"+CH
R$(0)
1420 cmenu%!92=0:cmenu%!96=20
1430 cmenu%!100=3:cmenu%!104=0
1440 cmenu%!108=&7000121
1450 DIM cmenu%!112 20
1460 $(cmenu%!112)="Desktop to desktop"
+CHR$(0)
1470 cmenu%!116=0:cmenu%!120=20
1480 cmenu%!124=&81:cmenu%!128=0
1490 cmenu%!132=&7000121
1500 DIM cmenu%!136 30
1510 $(cmenu%!136)="Keep palette if pos
s"
1520 cmenu%!140=0:cmenu%!144=30
1530 ENDPROC
1540 :
1550 DEF PROCpoll
1560 !block%=0
1570 mask%=1
1580 SYS "Wimp_Poll",mask%,block% TO re
ason%
1590 CASE reason% OF
1600 WHEN 2 : SYS "Wimp_OpenWindow",,bl
ock%
1610 WHEN 3 : SYS "Wimp_CloseWindow",,b
lock%
1620 WHEN 6 : PROCmouse
1630 WHEN 7 : PROCdrag
1640 WHEN 9 : PROCmenuselect
1650 WHEN 17,18 : PROCmessage
1660 WHEN 19 : IF waitingfortransfer% T
HEN PROCgetscrapfile
1670 ENDCASE
1680 ENDPROC
1690 :
1700 DEF PROCmouse
1710 CASE block%!12 OF
1720 WHEN -2 :
1730 CASE block%!8 OF
1740 WHEN 4,1 : IF spriteloaded% THEN P
ROCopen ELSE PROCtellemoff("To edit a sp
rite drag its icon to SprEd")
1750 WHEN 2 : PROCmenu(menu%,170)
1760 ENDCASE
1770 WHEN edit%
1780 CASE block%!8 OF
1790 WHEN 2 : PROCmenu(cmenu%,0)
1800 WHEN 4 :
1810 CASE block%!16 OF
1820 WHEN 17 : PROCstartdrag
1830 WHEN 20 : PROCalterratio(28,1)
1840 WHEN 21 : PROCalterratio(28,-1)
1850 WHEN 22 : PROCalterratio(29,1)
1860 WHEN 23 : PROCalterratio(29,-1)
1870 WHEN 24 : PROCalterratio(30,1)
1880 WHEN 25 : PROCalterratio(30,-1)
1890 WHEN 26 : PROCalterratio(31,1)
1900 WHEN 27 : PROCalterratio(31,-1)
1910 WHEN 36 : PROCnextsprite(1)
1920 WHEN 37 : PROCnextsprite(-1)
1930 WHEN 44 : PROCquicksave
1940 ENDCASE
1950 WHEN 1 :
1960 CASE block%!16 OF
1970 WHEN 20 : PROCalterratio(28,-1)
1980 WHEN 21 : PROCalterratio(28,1)
1990 WHEN 22 : PROCalterratio(29,-1)
2000 WHEN 23 : PROCalterratio(29,1)
2010 WHEN 24 : PROCalterratio(30,-1)
2020 WHEN 25 : PROCalterratio(30,1)
2030 WHEN 26 : PROCalterratio(31,-1)
2040 WHEN 27 : PROCalterratio(31,1)
2050 WHEN 36 : PROCnextsprite(-1)
2060 WHEN 37 : PROCnextsprite(1)
2070 ENDCASE
2080 ENDCASE
2090 ENDCASE
2100 ENDPROC
2110 :
2120 DEF PROCmenu(menu%,y%)
2130 SYS "Wimp_CreateMenu",,menu%,!bloc
k%-60,block%!4+y%
2140 menuselect%=menu%
2150 ENDPROC
2160 :
2170 DEF PROCmenuselect
2180 SYS "Wimp_GetPointerInfo",,q%
2190 IF q%!8=1 THEN remenu%=TRUE ELSE r
emenu%=FALSE
2200 CASE menuselect% OF
2210 WHEN menu%
2220 CASE !block% OF
2230 WHEN 0 : IF heap% THEN
2240 PROClooseheap
2250 !q%=edit%
2260 SYS "Wimp_CloseWindow",,q%
2270 spriteloaded%=FALSE
2280 ENDIF
2290 WHEN 2 : end%=TRUE
2300 ENDCASE
2310 WHEN cmenu%
2320 IF !block%=4 THEN
2330 cmenu%!124=cmenu%!124 EOR 1
2340 kpal%=kpal% EOR 1
2350 ELSE
2360 desktopcol%=!block%
2370 FOR i%=0 TO 3
2380 j%=i%*24+28
2390 IF i%=!block% THEN cmenu%!j%=1 ELS
E cmenu%!j%=0
2400 IF i%=3 THEN cmenu%!j%+=2
2410 NEXT
2420 ENDCASE
2430 ENDIF
2440 IF remenu% THEN SYS "Wimp_CreateMe
nu",,menuselect%
2450 ENDPROC
2460 :
2470 DEF PROCopen
2480 !q%=edit%
2490 SYS "Wimp_GetWindowState",,q%
2500 SYS "Wimp_CloseWindow",,q%
2510 SYS "Wimp_OpenWindow",,q%
2520 ENDPROC
2530 :
2540 DEF PROCalterratio(icon%,inc%)
2550 LOCAL val%
2560 val%=1
2570 CASE icon% OF
2580 WHEN 28 : IF xmantissa%>1 OR inc%>
0 THEN xmantissa%+=inc% : val%=xmantissa
% : PROCaltersize(13)
2590 WHEN 29 : IF xdivisor%>1 OR inc%>0
 THEN xdivisor%+=inc% : val%=xdivisor% :
 PROCaltersize(13)
2600 WHEN 30 : IF ymantissa%>1 OR inc%>
0 THEN ymantissa%+=inc% : val%=ymantissa
% : PROCaltersize(14)
2610 WHEN 31 : IF ydivisor%>1 OR inc%>0
 THEN ydivisor%+=inc% : val%=ydivisor% :
 PROCaltersize(14)
2620 ENDCASE
2630 PROCupdateicon(icon%,STR$(val%))
2640 ENDPROC
2650 :
2660 DEF PROCaltersize(icon%)
2670 LOCAL val%
2680 CASE icon% OF
2690 WHEN 13 : val%=width%*xmantissa%/x
divisor% : xout%=val%
2700 WHEN 14 : val%=height%*ymantissa%/
ydivisor% : yout%=val%
2710 ENDCASE
2720 PROCupdateicon(icon%,STR$(val%))
2730 ENDPROC
2740 :
2750 DEF PROCmessage
2760 yourref%=block%!8
2770 CASE block%!16 OF
2780 WHEN 0 : end%=TRUE
2790 WHEN 1 : IF NOT waitingfortransfer
% THEN PROCfetch ELSE PROCgetscrapfile
2800 WHEN 2 : PROCgetsavename:PROCmakes
prite:PROCsavesprite
2810 WHEN 3 : PROCgetloadname(FNtidy(bl
ock%+44)):PROCloadsprite
2820 WHEN 4 :
2830 WHEN 5 :
2840 WHEN 6 : IF sent% THEN PROCtransmi
tblank ELSE PROCmakesprite:PROCtransmits
prite
2850 WHEN 7 : PROCgrab
2860 ENDCASE
2870 ENDPROC
2880 :
2890 DEF PROCfetch
2900 IF heap% THEN PROClooseheap
2910 IF block%!40<>&ff9 THEN PROCtellem
off("Not a Sprite File") : ENDPROC
2920 SYS "Wimp_SlotSize",-1,-1 TO appsi
ze%
2930 heap%=HIMEM
2940 ext%=block%!36+4
2950 SYS "Wimp_SlotSize",appsize%+ext%,
-1
2960 SYS "OS_Heap",0,heap%,,ext%
2970 spritesin%=heap%+16
2980 !spritesin%=ext%
2990 block%!12=yourref%
3000 block%!16=6
3010 block%!20=spritesin%+4
3020 block%!24=block%!36
3030 SYS "Wimp_SendMessage",18,block%,b
lock%!4
3040 waitingfortransfer%=TRUE
3050 ENDPROC
3060 :
3070 DEF PROCgrab
3080 IF NOT waitingfortransfer% THEN EN
DPROC
3090 sprquan%=spritesin%!4
3100 spriteno%=1
3110 spriteloaded%=TRUE
3120 PROCinfosprite(1)
3130 PROCopen
3140 block%!12=yourref%
3150 block%!16=6
3160 block%!20=spritesin%+ext%
3170 block%!24=12
3180 REM SYS "Wimp_SendMessage",17,bloc
k%,block%!4
3190 waitingfortransfer%=FALSE
3200 ENDPROC
3210 :
3220 DEF PROCgetscrapfile
3230 !block%=64
3240 block%!12=yourref%
3250 block%!16=2
3260 block%!36=-1
3270 $(block%+44)="<Wimp$Scrap>"+CHR$(0
)
3280 SYS "Wimp_SendMessage",18,block%,b
lock%!4
3290 waitingfortransfer%=FALSE
3300 ENDPROC
3310 :
3320 DEF PROCgetloadname(load$)
3330 pathname$=load$
3340 IF INSTR(load$,"<Wimp$Scrap>")<1 T
HEN
3350 filein$=load$
3360 fileout$=FNaddx(filein$,10)
3370 $loadnameaddr%=filein$+CHR$(0)
3380 $savenameaddr%=fileout$+CHR$(0)
3390 ELSE
3400 $loadnameaddr%="<Untitled>"
3410 $savenameaddr%="<Untitled>"
3420 ENDIF
3430 ENDPROC
3440 :
3450 DEF PROCloadsprite
3460 IF heap% THEN PROClooseheap
3470 IF block%!40<>&ff9 THEN PROCtellem
off("Not a Sprite File") : ENDPROC
3480 in%=OPENIN pathname$
3490 ext%=(EXT# in%)+32
3500 CLOSE# in%
3510 $pointer%=pathname$+CHR$(0)
3520 SYS "Wimp_SlotSize",-1,-1 TO appsi
ze%
3530 heap%=HIMEM
3540 SYS "Wimp_SlotSize",appsize%+ext%,
-1
3550 SYS "OS_Heap",0,heap%,,ext%
3560 spritesin%=heap%+16
3570 !spritesin%=ext%
3580 spritesin%!4=0
3590 spritesin%!8=16
3600 spritesin%!12=16
3610 SYS "OS_SpriteOp",256+9,spritesin%
3620 SYS "OS_SpriteOp",256+10,spritesin
%,pointer%
3630 IF pathname$=scrap$ THEN
3640 *REMOVE <Wimp$Scrap>
3650 ENDIF
3660 sprquan%=spritesin%!4
3670 spriteno%=1
3680 spriteloaded%=TRUE
3690 PROCinfosprite(1)
3700 PROCupdateicon(35,STR$(spriteno%))
3710 PROCopen
3720 block%!12=yourref%
3730 block%!16=4
3740 SYS "Wimp_SendMessage",17,block%,b
lock%!20
3750 ENDPROC
3760 :
3770 DEF PROClooseheap
3780 heap%=0
3790 spriteloaded%=FALSE
3800 SYS "Wimp_SlotSize",appsize%,-1
3810 ENDPROC
3820 :
3830 DEF PROCinfosprite(sprite%)
3840 !q%=0
3850 SYS "OS_SpriteOp",13+256,spritesin
%,q%,12,sprite%
3860 SYS "OS_SpriteOp",40+256,spritesin
%,q% TO,,,width%,height%,sprmask%,mode%
3870 SYS "OS_SpriteOp",24+256,spritesin
%,q% TO,,spradd%
3880 IF spradd%!32<>44 THEN sprpalin%=s
pradd%+44 ELSE sprpalin%=0
3890 IF sprpalin% THEN cmenu%!124=&81 :
cmenu%!132=&7000121 :kpal%=1 ELSE cmenu%
!124=&80:cmenu%!132=&7400121 :kpal%=0
3900 spritein$=FNtidy(q%)
3910 spriteout$=FNaddx(spritein$,8)
3920 xout%=width%
3930 yout%=height%
3940 REM PROCupdateicon(19,filein$)
3950 REM PROCupdateicon(16,fileout$)
3960 PROCupdateicon(2,STR$(mode%))
3970 PROCupdateicon(4,STR$(width%))
3980 PROCupdateicon(6,STR$(height%))
3990 PROCupdateicon(39,spritein$)
4000 PROCupdateicon(12,STR$(mode%))
4010 PROCupdateicon(13,STR$(width%))
4020 PROCupdateicon(14,STR$(height%))
4030 PROCupdateicon(40,spriteout$)
4040 PROCresetratios
4050 ENDPROC
4060 :
4070 DEF PROCresetratios
4080 LOCAL icon%
4090 FOR icon%=28 TO 31
4100 PROCupdateicon(icon%,"1")
4110 NEXT
4120 xmantissa%=1
4130 xdivisor%=1
4140 ymantissa%=1
4150 ydivisor%=1
```




```
 4160 ENDPROC
 4170 :
 4180 DEFFNtidy(in%)
 4190 LOCAL i%,temp$,out$
 4200 REPEAT
 4210 temp$=CHR$(in%?i%)
 4220 IF ASC(temp$)>31 THEN out$=out$+te
mp$
 4230 i%+=1
 4240 UNTIL ASC(temp$)=0
 4250 =out$
 4260 :
 4270 DEFFNaddx(s$,length%)
 4280 IF LEN(FNleaf(s$))>=length% THEN R
IGHT$(s$,1)="X" ELSE s$+="X"
 4290 =s$
 4300 :
 4310 DEF PROCupdateicon(icon%,string$)
 4320 !q%=edit%
 4330 q%!4=icon%
 4340 SYS "Wimp_GetIconState",,q%
 4350 q%!8=0
 4360 q%!12=0
 4370 $q%!28=string$+CHR$(0)
 4380 SYS "Wimp_SetIconState",,q%
 4390 ENDPROC
 4400 :
 4410 DEFFNleaf(s$)
 4420 WHILE INSTR(s$,":")>0
 4430 s$=MID$(s$,INSTR(s$,":")+1)
 4440 ENDWHILE
 4450 WHILE INSTR(s$,".")>0
 4460 s$=MID$(s$,INSTR(s$,".")+1)
 4470 ENDWHILE
 4480 =s$
 4490 :
 4500 DEF PROCnextsprite(inc%)
 4510 spriteno%+=inc%
 4520 IF spriteno%<1 OR spriteno%>sprqua
n% THEN spriteno%-=inc% : ENDPROC
 4530 PROCupdateicon(35,STR$(spriteno%))
 4540 PROCinfosprite(spriteno%)
 4550 ENDPROC
 4560 :
 4570 DEF PROCstartdrag
 4580 !q%=edit%
 4590 SYS "Wimp_GetWindowState",,q%
 4600 z%=q%!16-q%!8
 4610 x%=q%!4:y%=q%!8:q%!4=17
 4620 SYS "Wimp_GetIconState",,q%
 4630 q%!8+=x%:q%!12+=y%+z%
 4640 q%!16+=x%:q%!20+=y%+z%
 4650 q%!24=0:q%!28=0
 4660 q%!32=1279:q%!36=1023
 4670 !q%=0:q%!4=5
 4680 SYS "Wimp_DragBox",,q%
 4690 ENDPROC
 4700 :
 4710 DEF PROCdrag
 4720 fileout$=FNleaf(FNfindtext(16))
 4730 size%=FNsize
 4740 !q%=0
 4750 SYS "Wimp_GetPointerInfo",,q%
 4760 IF q%!12=edit% THEN ENDPROC
 4770 q%!32=q%!4  :thirtytwo%=q%!32
 4780 q%!28=!q%   :twentyeight%=q%!28
 4790 q%!24=q%!16 :twentyfour%=q%!24
 4800 q%!20=q%!12 :twenty%=q%!20
 4810 q%!16=1
 4820 q%!12=0
 4830 q%!36=size%
 4840 q%!40=&ff9
 4850 $(q%+44)=fileout$+CHR$(0)
 4860 !q%=60
 4870 SYS "Wimp_SendMessage",18,q%,q%!20
,q%!24
 4880 ENDPROC
 4890 :
 4900 DEFFNsize
 4910 modeout%=VAL(FNfindtext(12))
 4920 SYS "OS_ReadModeVariable",modeout%
,3 TO ,,coloursout%
 4930 sizefactor%=(-1*(coloursout%=1))-(
1*(coloursout%=3))-(3*(coloursout%=15))-
(3*(coloursout%=63))+(1*sprmask%)
 4940 REM PROCtellemoff(STR$~(sizefactor
%))
 4950 =xout%*yout%*sizefactor%+256
 4960 :
 4970 DEF PROCgetsavename
 4980 pathname$=FNtidy(block%+44)
 4990 IF INSTR(pathname$,scrap$)<1 THEN
 5000 fileout$=pathname$
 5010 PROCupdateicon(16,fileout$)
 5020 ELSE
 5030 fileout$=newsprite$
 5040 PROCupdateicon(16,fileout$)
 5050 ENDIF
 5060 ENDPROC
 5070 :
 5080 DEF PROCmakesprite
 5090 spriteout$=FNfindtext(40)+CHR$(0)
 5100 size%=FNsize
 5110 SYS "OS_ReadModeVariable",mode%,3
TO ,,coloursin%
 5120 SYS "Wimp_SlotSize",-1,-1 TO appsi
zeout%
 5130 heapout%=heap%+ext%+32
 5140 SYS "Wimp_SlotSize",appsizeout%+si
ze%,-1
 5150 SYS "OS_Heap",0,heapout%,,size%
 5160 tempsprite%=heapout%
 5170 !tempsprite%=size%
 5180 tempsprite%!4=0
 5190 tempsprite%!8=16
 5200 REM tempsprite%!12=16
 5210 SYS "OS_SpriteOp",256+9,tempsprite
%
 5220 pcode%=ABS(kpal%=1 AND coloursin%=
coloursout%)
 5230 SYS "OS_SpriteOp",256+15,tempsprit
e%,spriteout$,pcode%,xout%,yout%,modeout
%
 5240 IF sprmask% THEN SYS "OS_SpriteOp"
,256+29,tempsprite%,spriteout$
 5250 PROCconvertsprite
 5260 ENDPROC
 5270 :
 5280 DEF PROCconvertsprite
 5290 LOCAL skip%
 5300 SYS "OS_Byte",229,0,0
 5310 skip%=1
 5320 SYS "Hourglass_On"
 5330 :
 5340 REM find palettes
 5350 CASE desktopcol% OF
 5360 WHEN 3
 5370 IF kpal% AND coloursin%=coloursout
% THEN
 5380 skip%=0
 5390 palin%=FNpalette(coloursin%,1)
 5400 palout%=FNkeeppalette
 5410 ELSE
 5420 palin%=FNpalette(coloursin%,1)
 5430 palout%=FNpalette(coloursout%,0)
 5440 ENDIF
 5450 WHEN 2
 5460 palin%=0
 5470 palout%=0
 5480 WHEN 1
 5490 palin%=0
 5500 palout%=FNpalette(coloursout%,0)
 5510 WHEN 0
 5520 palin%=FNpalette(coloursin%,1)
 5530 palout%=0
 5540 ENDCASE
 5550 :
 5560 REM make tables
 5570 IF palin%=1 THEN
 5580 IF palout%=1 THEN
 5590 skip%=0
 5600 ELSE
 5610 PROCpalette2
 5620 ENDIF
 5630 ELSE
 5640 IF palout%=1 THEN
 5650 PROCpalette1
 5660 ELSE
 5670 SYS "ColourTrans_SelectTable",mode
%,palin%,modeout%,palout%,palette%
 5680 ENDIF
 5690 ENDIF
 5700 :
 5710 REM the business
 5720 FOR y%=0 TO yout%-1
 5730 FOR x%=0 TO xout%-1
 5740 SYS "OS_SpriteOp",256+41,spritesin
%,spritein$,x%*xdivisor%/xmantissa%,y%*y
divisor%/ymantissa% TO ,,,,,colour%,tint
%
 5750 IF skip% THEN tint%=tintpal%?colou
r% : colour%=palette%!colour%
 5760 SYS "OS_SpriteOp",256+42,tempsprit
e%,spriteout$,x%,y%,colour%,tint%
 5770 IF mask% THEN
 5780 SYS "OS_SpriteOp",256+43,spritesin
%,spritein$,x%*xdivisor%/xmantissa%,y%*y
divisor%/ymantissa% TO ,,,,,maskcolour%
 5790 SYS "OS_SpriteOp",256+44,tempsprit
e%,spriteout$,x%,y%,maskcolour%
 5800 ENDIF
 5810 perc%=(xout%*y%*100)/(xout%*yout%)
 5820 SYS "Hourglass_Percentage",perc%
 5830 NEXT
 5840 NEXT
 5850 SYS "Hourglass_Off"
 5860 SYS "OS_Byte",229,1,0
 5870 SYS "OS_Byte",124
 5880 ENDPROC
 5890 :
 5900 DEFFNpalette(colours%,code%)
 5910 LOCAL palette%
 5920 IF sprpalin%>0 AND code% THEN
 5930 palette%=FNsprpalette
 5940 ELSE
 5950 CASE colours% OF
 5960 WHEN 63 : palette%=1
 5970 WHEN 15 : palette%=table%
 5980 WHEN 3 : palette%=table%+128
 5990 WHEN 1 : palette%=table%+144
 6000 ENDCASE
 6010 ENDIF
 6020 =palette%
 6030 :
 6040 DEFFNsprpalette
 6050 IF coloursin%=63 THEN
 6060 =1
 6070 ELSE
 6080 FOR i%=0 TO coloursin%
 6090 temppal%!(i%*4)=sprpalin%!(i%*8)
 6100 tintpal%?i%=0
 6110 NEXT
 6120 =temppal%
 6130 ENDIF
 6140 :
 6150 DEFFNkeeppalette
 6160 SYS "OS_SpriteOp",24+256,tempsprit
e%,spriteout$ TO,,spraddout%
 6170 FOR i%=32 TO (spradd%!32)-1
 6180 spraddout%?i%=spradd%?i%
 6190 NEXT
 6200 =spraddout%+44
 6210 :
 6220 DEF PROCpalette2
 6230 FOR i%=0 TO 63
 6240 SYS "ColourTrans_ReturnColourNumbe
rForMode",FNinvert(i%),modeout%,palout%
TO col%
 6250 palette%?i%=col%
 6260 NEXT
 6270 ENDPROC
 6280 :
 6290 DEF PROCpalette1
 6300 FOR i%=0 TO coloursin%
 6310 palette%?i%=FNconvert(palin%!(i%*4
))
 6320 tintpal%?i%=tint%
 6330 NEXT
 6340 ENDPROC
 6350 :
 6360 DEF PROCsavesprite
 6370 $savename%=pathname$+CHR$(0)
 6380 SYS "OS_SpriteOp",256+12,tempsprit
e%,savename%
 6390 IF quicksave%=0 THEN
 6400 q%!32=thirtytwo%
 6410 q%!28=twentyeight%
 6420 q%!24=twentyfour%
 6430 q%!20=twenty%
 6440 q%!16=3
 6450 q%!12=yourref%
 6460 q%!36=size%
 6470 q%!40=&ff9
 6480 $(q%+44)=FNleaf($savename%)+CHR$(0
)
 6490 !q%=60
 6500 SYS "Wimp_SendMessage",18,q%,q%!20
,q%!24
 6510 ENDIF
 6520 quicksave%=0
 6530 SYS "Wimp_SlotSize",appsizeout%,-1
 6540 ENDPROC
 6550 :
 6560 DEF PROCtransmitsprite
 6570 SYS "Wimp_TransferBlock",task%,tem
psprite%+4,block%!4,block%!20,size%
 6580 block%!16=7
 6590 block%!12=yourref%
 6600 block%!24=size%
 6610 SYS "Wimp_SendMessage",18,block%,b
lock%!4
 6620 sent%=TRUE
 6630 ENDPROC
 6640 :
 6650 DEF PROCtransmitblank
 6660 SYS "Wimp_TransferBlock",task%,tem
psprite%+size%,block%!4,block%!20,0
 6670 block%!16=7
 6680 block%!12=yourref%
 6690 block%!24=0
 6700 SYS "Wimp_SendMessage",17,block%,b
lock%!4
 6710 sent%=FALSE
 6720 SYS "Wimp_SlotSize",appsizeout%,-1
 6730 ENDPROC
 6740 :
 6750 DEFFNconvert(colour%)
 6760 LOCAL red%,green%,blue%
 6770 c%=colour%>>8
 6780 red%=(c% AND &F0)/&40
 6790 green%=(c% AND &F000)/&4000
 6800 blue%=(c% AND &F00000)/&400000
 6810 tint%=(red%+green%+blue%)*&FF/9
 6820 green%=green%<<2
 6830 blue%=blue%<<4
 6840 colour%=red%+green%+blue%
 6850 =colour%
 6860 :
 6870 DEFFNinvert(colour%)
 6880 LOCAL red%,green%,blue%
 6890 red%=colour% AND %11
 6900 green%=(colour% AND %1100)>>2
 6910 blue%=(colour% AND %110000)>>4
 6920 red%=red%*&40
 6930 green%=green%*&4000
 6940 blue%=blue%*&400000
 6950 colour%=red%+green%+blue%
 6960 colour%=colour%<<8
 6970 =colour%
 6980 :
 6990 DEFFNfindtext(icon%)
 7000 !q%=edit%
 7010 q%!4=icon%
 7020 SYS "Wimp_GetIconState",,q%
 7030 =$q%!28
 7040 :
 7050 DEF PROCquicksave
 7060 savename$=FNfindtext(16)
 7070 IF INSTR(savename$,".")<1 OR INSTR
(savename$,":")<1 THEN
 7080 PROCtellemoff("Drag the icon to a
directory viewer or sprite file window")
 7090 ELSE
 7100 pathname$=savename$
 7110 quicksave%=1
 7120 PROCmakesprite
 7130 PROCsavesprite
 7140 ENDIF
 7150 ENDPROC
```

Life

Listing 1

```
   10 REM >LifeAss (Life1)
   20 REM By J.G.Harston
   30 REM Based on Phil Bender's
   40 REM in BAU May 1990
   50 REM B/B+/M/C
   60 REM (C) BAU
   70 :
   80 MODE7
   90 clo=&70:chi=&71
  100 vlo=&72:vhi=&73
  110 tempa=&74:tempx=&75:tempy=&76
  120 loy=&77:hiy=&78
  130 scrlo=&79:scrhi=&7A
  140 gen=&7B:delay=&7F:char=&80
  150 birth=&AFF:REM age at birth
  160 senile=&AFE
  170 col=&C00:row=&C80
  180 cells=&2000:votes=&2800
  190 osbyte=&FFF4:oswrch=&FFEE
  200 FOR opt=0 TO 3 STEP3
  210 P%=&900
  220 [OPT opt
  230 .zero
  240 STA vhi
  250 LDX #8
  260 LDA #0
  270 STA vlo
  280 TAY
  290 .loop
  300 STA (vlo),Y
  310 INY
  320 BNE loop
  330 INC vhi
  340 DEX
  350 BNE loop
  360 RTS
  370 :
  380 .life
  390 SEI
  400 LDA #cells DIV 256
  410 STA chi
  420 LDA #0
  430 STA clo
  440 LDX #31
  450 .loop2
  460 LDY #63
  470 .loop3
  480 LDA (clo),Y
  490 BEQ next
  500 JMP vote
  510 .next
  520 DEY
  530 BPL loop3
  540 LDA clo
  550 CLC
  560 ADC #64
  570 STA clo
  580 BCC done1
  590 INC chi
  600 .done1
  610 DEX
  620 BPL loop2
  630 :
  640 .update
  650 LDA #votes DIV 256
  660 STA vhi
  670 LDA #cells DIV 256
  680 STA chi
  690 LDA #0
  700 STA vlo
  710 STA clo
  720 LDX #0
  730 .loop4
  740 LDY #63
  750 .loop5
  760 LDA (vlo),Y
  770 BEQ nowt
  780 CMP #4
  790 BNE chk3
  800 LDA #0
  810 STA (vlo),Y
  820 .check_age
  830 LDA (clo),Y
  840 BEQ nowt
  850 BIT senile
  860 BMI nowt
  870 CLC
  880 ADC #1
  890 STA (clo),Y
  900 BEQ kill_off
  910 CMP #&F8
  920 BNE nowt
  930 JSR print
  940 JMP nowt
  950 .chk3
  960 CMP #3
  970 BNE dead
  980 LDA #0
  990 STA (vlo),Y
 1000 LDA (clo),Y
 1010 BNE check_age
 1020 LDA birth:\ New one born
 1030 JSR print
 1040 JMP nowt
 1050 .dead
 1060 LDA #0
 1070 STA (vlo),Y
 1080 LDA (clo),Y
 1090 BEQ nowt
 1100 .kill_off
 1110 LDA #0
 1120 JSR print:\ dead cell
 1130 .nowt
```

```
1140 DEY
1150 BPL loop5
1160 INX
1170 LDA vlo
1180 CLC
1190 ADC #64
1200 STA vlo
1210 STA clo
1220 BCC loop4
1230 INC vhi
1240 INC chi
1250 CPX #32
1260 BNE loop4
1270 \ all done
1280 LDX #0
1290 .loop6
1300 INC gen,X
1310 LDA gen,X
1320 CMP #58
1330 BNE nocarry
1340 LDA #48
1350 STA gen,X
1360 INX
1370 CPX #4
1380 BNE loop6
1390 .nocarry
1400 LDA #31
1410 JSR oswrch
1420 LDA #73
1430 JSR oswrch
1440 LDA #25
1450 JSR oswrch:\ TAB(73,25);
1460 LDX #3
1470 .loop7
1480 LDA gen,X
1490 JSR oswrch
1500 DEX
1510 BPL loop7
1520 LDA delay
1530 BEQ key1
1540 .loopA
1550 TAX
1560 .loopB
1570 LDY #0
1580 .loopC
1590 INY
1600 BNE loopC
1610 DEX
1620 BNE loopB
1630 DEC delay
1640 BNE loopA
1650 STA delay
1660 .key1
1670 LDX #&CF
1680 JSR rd_key
1690 BCC key2
1700 LDA #24
1710 STA delay
1720 JMP life
1730 .key2
1740 LDX #&CE
1750 JSR rd_key
1760 BCC key3
1770 LDA #10
1780 STA delay
1790 JMP life
1800 .key3
1810 LDX #&EE
1820 JSR rd_key
1830 BCC p
1840 LDA #0
1850 STA delay
1860 JMP life
1870 .p
1880 LDX #&C8
1890 JSR rd_key
1900 BCC q
1910 .o
1920 LDX #&C9
1930 JSR rd_key
1940 BCC o
1950 .q
1960 LDX #&EF
1970 JSR rd_key
1980 BCS ret
1990 JMP life
2000 .ret
2010 CLI
2020 RTS
2030 .rd_key
2040 LDA #&81
2050 LDY #&FF
2060 JMP osbyte
2070 :
2080 .add_voteC
2090 CLC
2100 .add_vote
2110 LDA (vlo),Y
2120 ADC #1
2130 STA (vlo),Y
2140 RTS
2150 .vote
2160 STY tempy      \ 123
2170 LDA clo        \ 4*6
2180 STA vlo        \ 789
2190 LDA chi
2200 CLC
2210 ADC #8
2220 STA vhi
2230 JSR add_vote  \ 5
2240 DEY
2250 TYA
2260 AND #63
2270 TAY
2280 STY loy
2290 JSR add_vote  \ 4
2300 INY
2310 INY
2320 TYA
2330 AND #63
2340 TAY
2350 STY hiy
2360 JSR add_vote  \ 6
2370 LDA vlo
2380 SEC
2390 SBC #64
2400 STA vlo
2410 BCS here1
2420 DEC vhi
2430 LDA vhi
2440 CMP #&27
2450 BNE here1
2460 LDA #&2F
2470 STA vhi
2480 .here1
2490 JSR add_voteC \ 3
2500 LDY tempy
2510 JSR add_vote  \ 2
2520 LDY loy
2530 JSR add_vote  \ 1
2540 LDA vlo
2550 CLC
2560 ADC #128
2570 STA vlo
2580 BCC here2
2590 INC vhi
2600 LDA vhi
2610 CMP #&30
2620 BNE here2
2630 LDA #&28
2640 STA vhi
2650 .here2
2660 JSR add_voteC \ 7
2670 LDY hiy
2680 JSR add_vote  \ 8
2690 LDY tempy
2700 JSR add_vote  \ 9
2710 JMP next
2720 :
2730 .print
2740 STY tempy
2750 STX tempx
2760 STA tempa
2770 STA (clo),Y
2780 TYA
2790 ASL A
2800 TAY
2810 TXA
2820 ASL A
2830 TAX
2840 LDA row,X
2850 CLC
2860 ADC col,Y
2870 STA scrlo
2880 LDA row+1,X
2890 ADC col+1,Y
2900 STA scrhi
2910 LDX #7:LDY #7
2920 LDA tempa
2930 BEQ nul
2940 CMP #&F8:BNE loop8
2950 LDX #15
2960 .loop8
2970 LDA char,X
2980 STA (scrlo),Y
2990 DEX:DEY
3000 BPL loop8
3010 BMI fin
3020 .nul
3030 STA (scrlo),Y
3040 DEY
3050 BPL nul
3060 .fin
3070 LDX tempx
3080 LDY tempy
3090 RTS
3100 .end
3110 ]
3120 ?senile=0:?birth=1
3130 NEXT
3140 OSCLI"*SAVE LIFCODE FFFF0900+200 "
+STR$~(&FFFF0000 OR ret)
3150 END
```

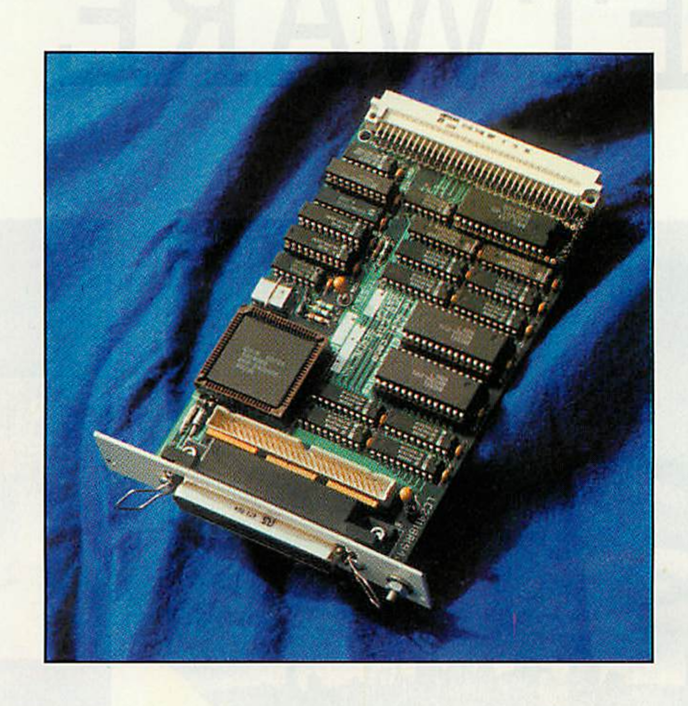
Listing 2

```
   10 REM >Life (Life2)
   20 REM by Jonathon Harston
   30 REM (c) BAU Jan 92
   40 REM for B/B+/M/C/E
   50 :
   60 A%=130:IF(USR&FFF4 AND&FFFF00)<>&F
FFF00 PRINT"Turn off Tube.":END
   70 IF !&900<>&8A27385 THEN *LOAD LIFC
ODE
   80 *K.0
   90 IFPAGE>&1400 PROCr
  100 *FX4,1
  110 X%=1:A%=114:CALL&FFF4:*TV0,1
  120 MODE0:VDU23;8202;0;0;0;:HIMEM=&200
0:J%=RND(-TIME):G%=&7B:d%=&7F:Z%=&900:L%
=&914:c%=&2000:V%=&2800:PROCt:?d%=10:F%=
3:B%=4:VDU19,0,B%;0;19,1,F%;0;
  130 A%=c%DIV256:CALLZ%:ONERROR IFFNx O
SCLI"FX4":END
  140 REPEAT:PROCe:IFQ%=10 PROCo
  150 UNTILFALSE:END
  160 DEFPROCv:VDU28,64,31,79,0,17,129,1
7,0,12:PRINTTAB(5,2)"LIFE"TAB(2,5)"P - p
ause"TAB(2,7)"O - resume"TAB(2,9)"Q - qu
it"TAB(2,11)"1 - Slow"TAB(2,13)"2 - Medi
um"TAB(2,15)"3 - Fast":VDU26,17,1,17,128
  170 PRINTTAB(66,25)" Gen : 0000 "TAB(X
%,Y%)CHR$(FNp+253);:!G%=&30303030:A%=V%D
IV256:CALLZ%:*FX229,1
  180 CALLL%:*FX229
  190 ENDPROC
  200 DEFPROCt:col%=&C00:row%=&C80:FORJ%
=0TO63:!(col%+2*J%)=J%*8:NEXT:FOR J%=0 T
O 31:!(row%+2*J%)=&3000+J%*&280:NEXT
  210 FORK%=0TO2:VDU23,253+K%:FORJ%=0TO7
:READ D%:VDUD%:?(&78+J%+K%*8)=D%:NEXT:NE
XT:RESTORE:FORK%=0TO1:VDU23,251+K%:FORJ%
=0TO7:READ D%:VDUD%EOR&FF:NEXT:NEXT:ENDP
ROC
  220 DATA 0,0,0,0,0,0,0,0,0,24,60,110,7
8,110,60,24,0,0,24,&2C,&24,&2C,24,0
  230 DEFPROCe:VDU17,128,28,64,31,79,0,1
7,129,17,0,12:PRINTTAB(5,1)"LIFE"TAB(2,3
)"KEYS:-"''"  Z,X,:,/,-"'"  move cursor"
''"  SPACE BAR -"'"  set cell"''"  DELET
E -"'"  remove cell"''"  R - random"''"
 A - age (";256-?&AFF;")"
  240 PRINT'"  D - Death o";:PROCd
  250 PRINT'"  F,B - change"'"  colours"
''"  RETURN -"'"  start"''"  L - Load"''
"  S - Save"
  260 VDU26,17,1,17,128:X%=31:Y%=15:PRIN
TTAB(X%,Y%)CHR$(FNp+251);:REPEAT
  270 IFINKEY-101 B%=(B%+1)AND7:VDU19,0,
B%;0;
  280 IFINKEY-68 F%=(F%+1)AND7:VDU19,1,F
%;0;
  290 IFINKEY-98ORINKEY-26 PROCm(63,0)
  300 IFINKEY-67ORINKEY-122 PROCm(1,0)
  310 IFINKEY-73 ANDNOTINKEY-1 ORINKEY-5
8 PROCm(0,31)
  320 IFINKEY-105ORINKEY-42 PROCm(0,1)
  330 IFINKEY-99 PROCp(?&AFF)
  340 IFINKEY-90ORINKEY-97 PROCp(0)
  350 IFINKEY-83 A%=c%DIV256:CALLZ%:VDU2
8,0,31,63,0:PROCx:PRINTTAB(X%,Y%)CHR$251
  360 IFINKEY-52 REPEAT PROCm(RND AND63,
RND AND31):PROCp(RND(255)):UNTILNOTINKEY
-52
  370 Q%=INKEY(20)AND&DF:IFQ%=83 PROCs
  380 IFQ%=76 PROCl
  390 IFQ%=68 ?&AFE=NOT?&AFE:COLOUR0:COL
OUR129:PRINTTAB(77,18);:PROCd:COLOUR1:CO
LOUR128
  400 IFQ%=65 PROCa
  410 UNTILQ%=10ORINKEY-74:IFINKEY-74 PR
OCv
  420 ENDPROC
  430 DEFPROCd:IF?&AFE PRINT"n " ELSE PR
INT"ff"
  440 ENDPROC
  450 DEFPROCm(x%,y%):PRINTTAB(X%,Y%)CHR
$(FNp+253);:X%=(X%+x%)AND63:Y%=(Y%+y%)AN
D31:PRINTTAB(X%,Y%)CHR$(FNp+251);:ENDPRO
C
  460 DEFFNp=(?(c%+X%+64*Y%)<>0)AND1
  470 DEFPROCp(C%):?(c%+X%+64*Y%)=C%:PRO
Cm(0,0):ENDPROC
  480 DEFFNx:PROCw:IFERR=17 PRINT"Finish
? (Y/N)":IF(GET AND&DF)=89 PROCx:OSCLI"F
X4":END
  490 IFERR<>17 REPORT:Q%=GET
  500 PROCx:=INKEY-1
  510 DEFPROCw:VDU28,64,31,79,30:COLOUR1
29:COLOUR0:CLS:ENDPROC
  520 DEFPROCx:CLS:VDU26:COLOUR128:COLOU
R1:ENDPROC
  530 DEFPROCa:PROCw:INPUT"Max age: "Q%:
IFQ%<10 ORQ%>255 ENDPROC
  540 VDU26:PRINTTAB(75,16)"    "TAB(75,
16);Q%;")":PROCw:PRINT"Please wait..."
  550 Q%=256-Q%:?&AFF=Q%:FORJ%=&2000 TO
&27FF:IF?J%<Q% AND?J% ?J%=Q%
  560 NEXT:PROCx:ENDPROC
  570 DEFPROCs:PROCw:INPUT"Save: "s$:OSC
LI"SAVE "+s$+" 2000+800":PROCx:ENDPROC
  580 DEFPROCl:PROCw:INPUT"Load: "s$:OSC
LI"LOAD "+s$+" 2000":PROCx:FORK%=0TO31:V
DU31,0,K%:FORJ%=0TO63:VDU32-222*((?(c%+K
%*64+J%))<>0):NEXT:NEXT:PRINTTAB(X%,Y%)C
HR$(FNp+251);:ENDPROC
  590 DEFPROCo:PROCw:VDU28,66,31,78,0,12
,28,67,31,76,0:REPEATINPUTLINE"*"A$:OSCL
IA$:UNTILA$="":PROCx:REPEATUNTILINKEY-74
=0:ENDPROC
  600 DEFPROCr:*KEY0 F.X%=0TO(TOP-PAGE)S
.4:X%!&1400=X%!PA.:N.:PA.=&1400|MO.|MRUN
|M
  610 *FX225,1
  620 *FX138,0,128
  630 END
```

Notes

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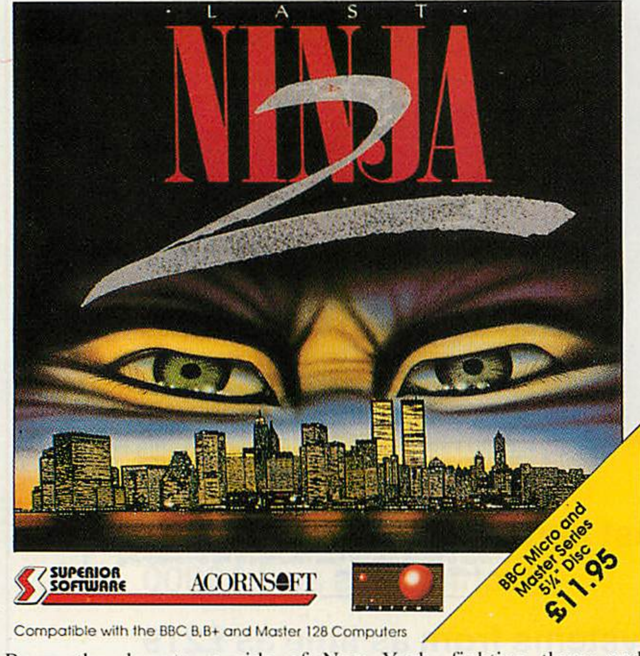
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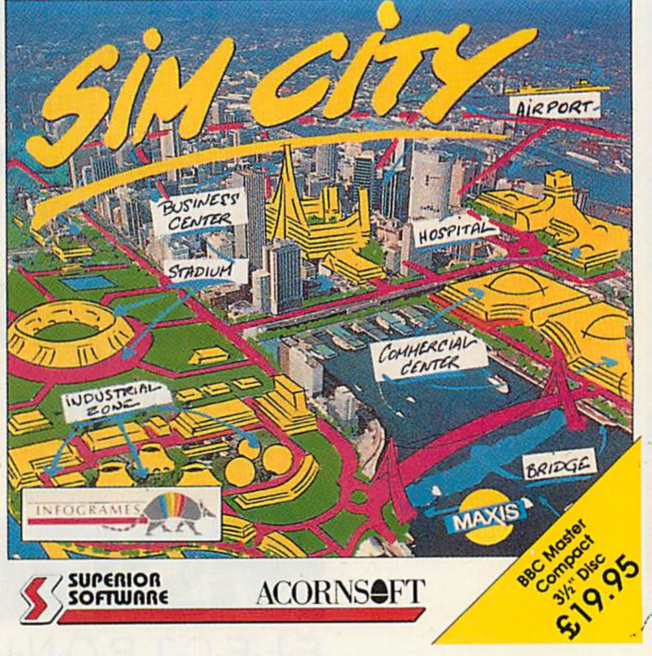
Roam the downtown side of New York, fighting thugs and bandits. Will you get to the Kunitoki Castle to face your enemy?



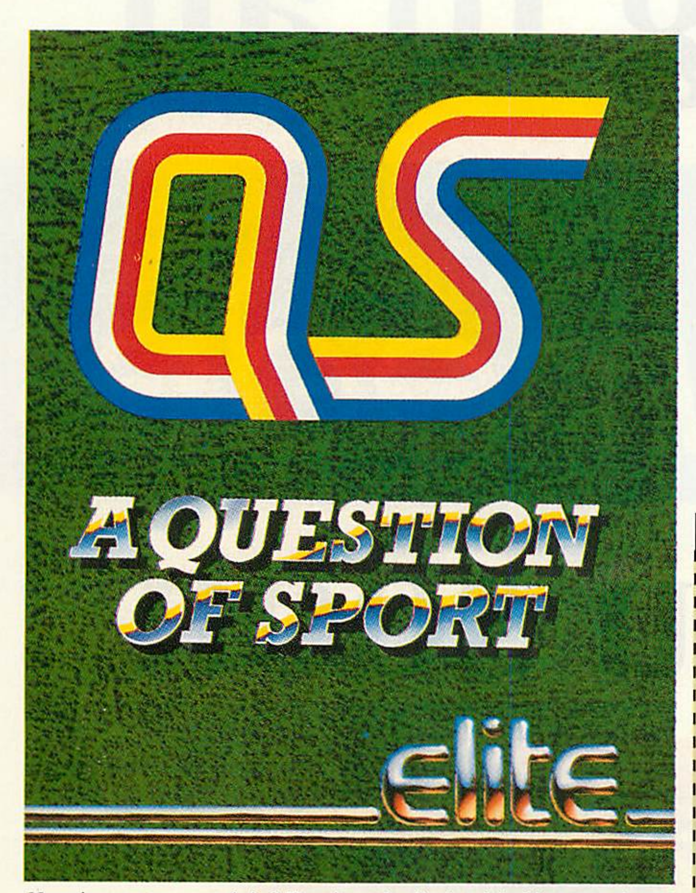
Speech, the highly acclaimed speech synthesizer for the BBC, needs no hardware to make your micro talk. but uses simple commands to invoke words. If you haven't got this program, now's your chance!



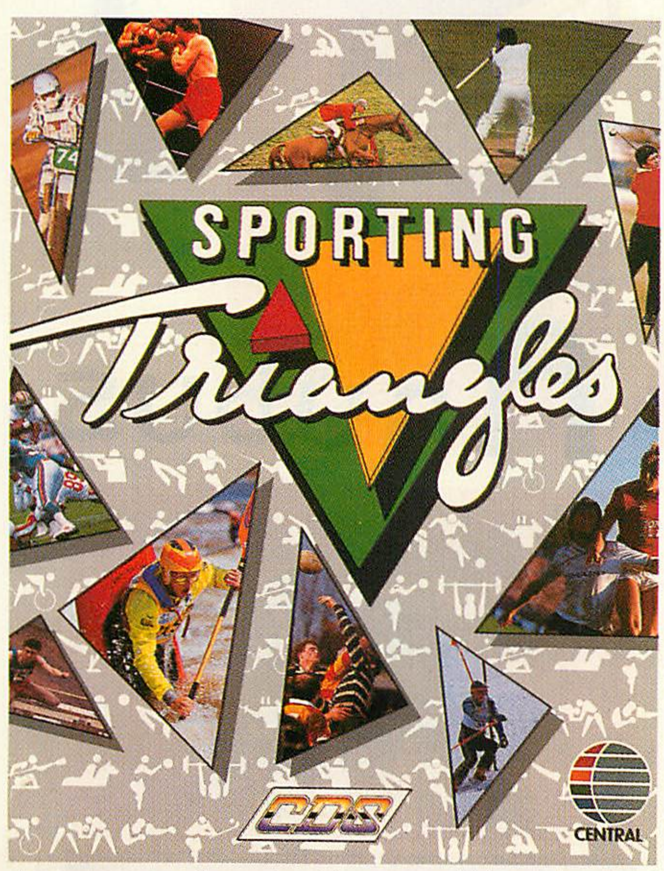
Ricochet has 330 different levels of play. It's your job to guide Sprat around the huge landscapes, solving the myriad of puzzles.



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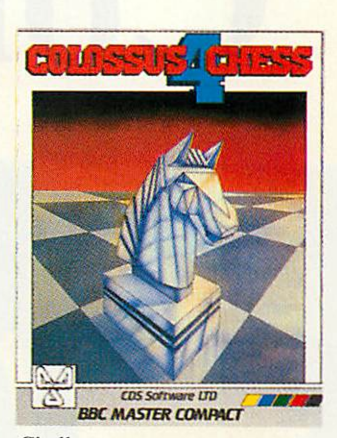
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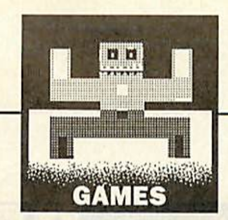
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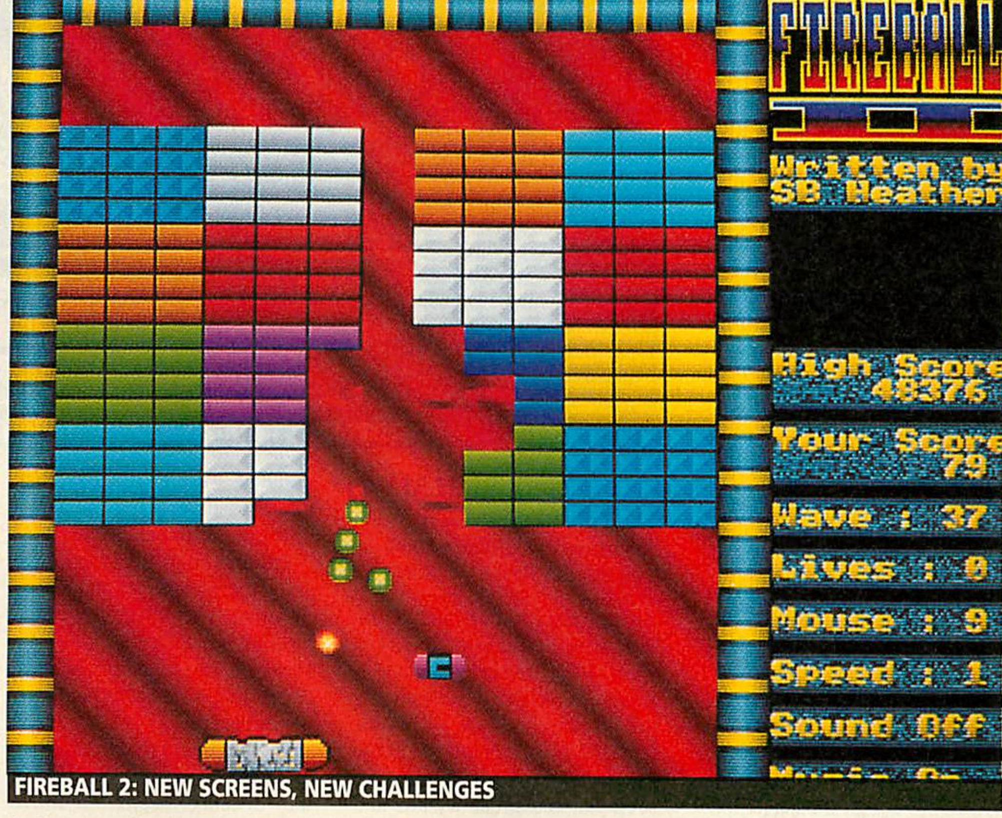


GAME SHOW

Following the success of *Lemmings* at the *BAU* Show, publisher Krisalis Software has committed itself to greater participation in the Acorn games world.

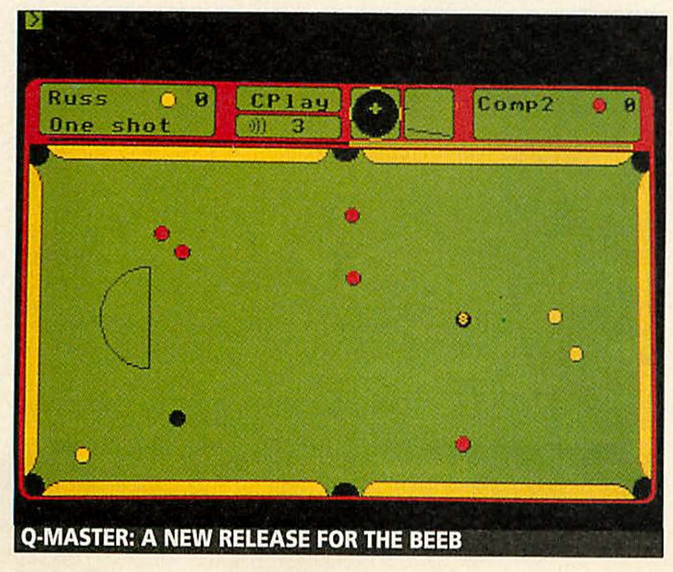
Its plan for the next year is to launch one game a month, the first two releases being conversions of *Swiv* (January) and *Gods* (February) from the Amiga. It will only have one release before Christmas – namely, *James Pond*.

Swiv is best described as a vertically scrolling shoot-em-up. Well, we've seen that before, but the Amiga version has picked up virtually every games industry award in the past year and was described by one magazine as 'undoubtedly the best shoot-em-up on the Amiga'. *Gods* has earned similar acclaim for its style of play in the ladders 'n' platforms environment. Set in early Greek times, Tony Kavanagh of Krisalis describes it as more 'serious' than the satirical *Chuck Rock*.



FIREBALL 2: NEW SCREENS, NEW CHALLENGES

Easter will see the release of a further 100 screens for existing *Lemmings* players. Loads of people have sent in the full set of passwords for the original game (thank you), but we won't be printing them until the new screens are out next year. Meanwhile, you will just have to think a bit harder. It may help to know, if you don't already, that a blocker can be turned back into a walker by digging away the earth beneath its feet. Thanks to W Glendinning of Crowthorne in Berkshire for that tip.



Q-MASTER: A NEW RELEASE FOR THE BEEB

The Fourth Dimension's schedule is described in its 16-page advertisement this month. Quite a few new games are shown alongside existing ones and (hopefully) most should be out before Christmas.

If you are looking for advice on which games to buy this Christmas, then undoubtedly the *BAU* Games Supplement in the November issue will have been helpful.

However, some games were not featured because they have only just been, or have yet to be, released. *Cataclysm* from The Fourth Dimension is one, in which you have to drain your waterlogged spaceship (which has crashed into an ocean) by flying round with a jetpack and opening watertight doors. I've played an early version of this and enjoyed it very much. Graphically it isn't stunning, but the motion of the water is fairly convincing and the puzzles have a definite *Repton* feel to them – Beeb hacks will know what I'm talking about.

As revealed in last month's news, Simis, the Guildford-based software company, having written two flight simulators for Clares (*Interdictor 1* & *2*), and two more for Domark (*MiG-29 1* & *2*), has decided to release its development tools as a separate product. I saw the tools being used to design *Interdictor 2* a year ago at the company's offices and suggested then that they would

make very welcome companions to the original games, especially as they function nicely within the desktop. I'm looking forward to creating my own custom-designed flight simulator. Apparently you can alter all the graphics, the scenario layout and the aircraft model as well as the cockpit design. Simis has promised that the flight simulator toolkit will be ready for Christmas.

For BBC owners, however, the selection is somewhat limited. Besides *Play it Again Sam 16* (see review) the only new release is *Q-Master* from The Fourth Dimension, although *Loopz* from Audiogenic was launched in the summer and is still available.

Q-Master is a pool game with an action replay feature and a variety of game types, ranging from practice tables to friendly matches to tournaments. However, the view is two-dimensional, looking from overhead, and, although I've never played the game, it looks a bit old-fashioned from the screen shots.

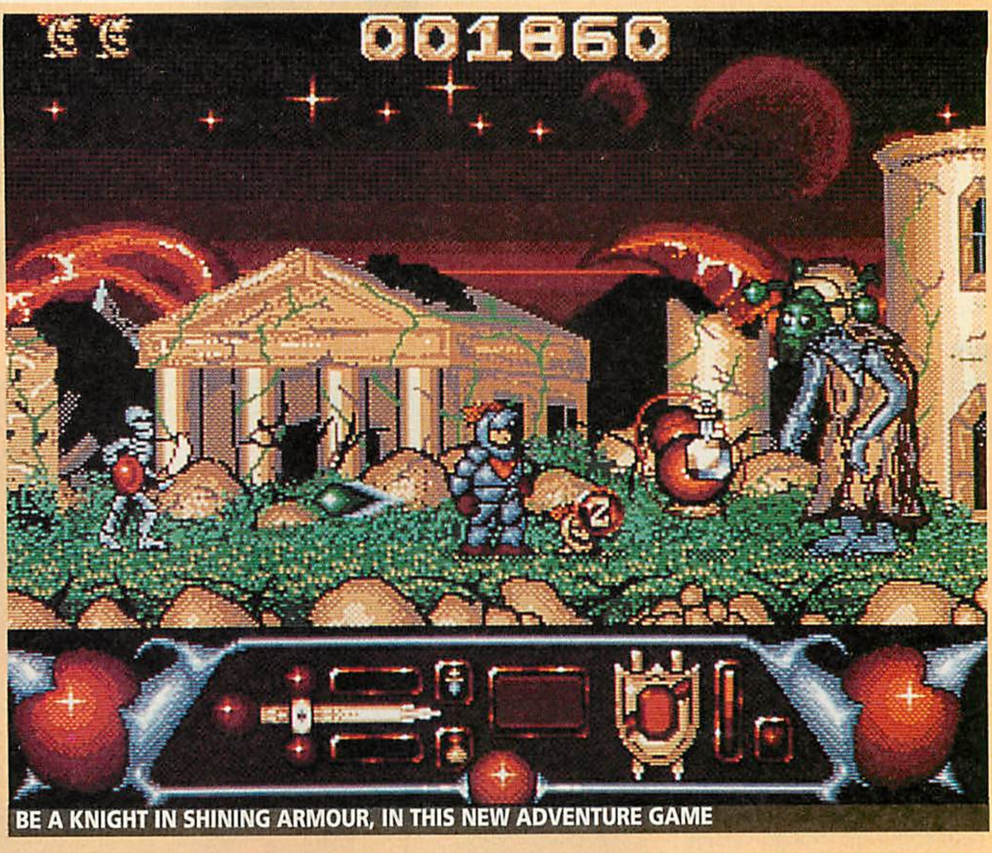
A couple of years back Firebird released a pool game for the Beeb called *3D Pool* which was spectacular, mainly due to the realism of the 3D. I'll reserve judgement on *Q Master* until I've played it.

The Fourth Dimension has also released two compendium packages of the golf game, *Holed Out*, and the car game, *E-Type*. At £24.95 each, they both contain the original games and all the extra courses/tracks that followed, as well as their respective course or track designers.

If your budget is small this year, take a look at *Escape* by Exeria (Risc OS machines), marketed by Soft Rock Software, 124 Marissal Road, Henbury, Bristol BS10 7NP. Available by mail order for only £3.49 including p&p. It's a simple game with quite blocky graphics, but it is worth playing and, at that price, it can't do any harm.

Finally, CIS has released a new set of screens for *Fireball 2*. These are more difficult but only just, so if you managed to complete the initial set, give CIS a call on 071-226 3340. And, on that note, have a very Gamey New Year.

Sam Greenhill



BE A KNIGHT IN SHINING ARMOUR, IN THIS NEW ADVENTURE GAME

ENTER THE REALM

The Fourth Dimension
Archimedes/A3000/A5000
Tel: (0742) 700661 £24.95

Enter The Realm could be described as the sequel to *Nevryon* – but instead of aliens it features knights. Written by the same author, Graeme Richardson, you play the noble knight Kharas, whose job is to seek out the great wizard and perform the obligatory quest.

Although the game manual hints differently (there is mention of gallivanting around on horseback), Kharas travels on foot, avoiding obstacles and killing nasties. Armed only with a set of knives and a strong right arm, he must progress through various lands in his search for truth.

At stages along the way buildings can be entered; some contain clues to help you on your way, others house a selection of do-gooders, keen to offer advice. By following their instructions, Kharas can work out what his quest really is and gets down to the important job of monster bashing.

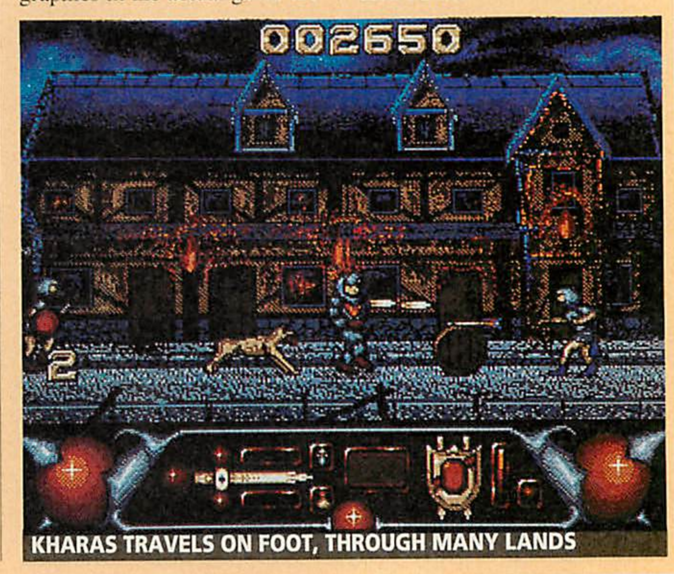
The game takes place on a horizontally scrolling landscape, similar to your average arcade adventure. What makes it stand out are the six levels of parallax, used to excellent effect to give a real sense of depth to the screen.

Parallax scrolling is basically the technique of moving different parts of the background (and foreground) at slower or faster speeds, depending on their depth in the overall scene.

If you imagine looking out of a train window, the hills in the distance seem to move much slower than the trees alongside the train track. This is the effect parallax utilises to give an illusion of depth. The graphics in the actual game are pretty good, if a little uncolourful. However, there is a price to pay for the fast (50 frames per second), multi-layer parallax – mode 9 is used throughout, limiting graphics to 16 colours maximum at a time. The sound effects are of a high standard and the opening music sets the mood.

Like other adventure games, there is little to hold your attention once completed, but this is likely to take a while. If striding around in a tin can is your idea of fun, *Enter the Realm* is perfect.

Rob Miller



KHARAS TRAVELS ON FOOT, THROUGH MANY LANDS

CARTOON LINE

Eterna
Tel: (0933) 279300
Archimedes/A3000/A5000
£19.95

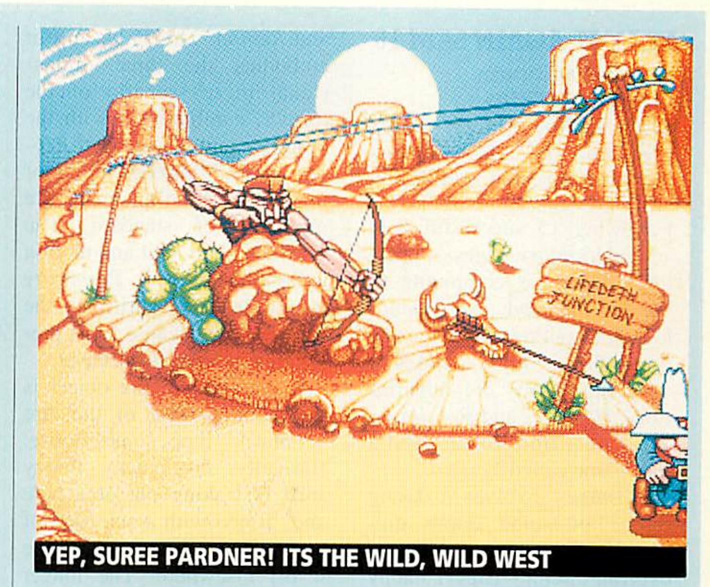
'Dig! Dig!' I screamed in frustration as the buffalo stampeded towards the cowboy in the middle of the screen who is supposedly under my control. Too late! He was rocketed into the air and, well, what goes up must come down. Ouch!

Cartoon Line is as much fun to watch as it is to play. The storyline basically goes like this: a little guy called LBJ is confronted in the Wild West by several attackers such as brutal buffalos, evil Indians, savage snakes and a whole handful more. You must kill, avoid or hurt the assassins.

When you've defeated all of them at least once in each trial, you meet the shamen who leads you to the next level. There you'll meet more killers. The graphics and sound effects are excellent and our hero dies in sometimes funny and sometimes gross ways.

Although more like a cartoon than a game it does require a certain amount of skill to stay alive. I would like to have seen if the opponents on the higher levels were as amusing, but it is annoyingly hard to complete the first level. It is the sort of game that requires an awful lot of patience and after a while I felt like ramming the keyboard through the screen.

You can walk left or right, jump, duck and use the predefined action key to do whatever is necessary. When the Red Indian charges at him, pressing the action key makes LBJ draw his gun and shoot; when the scorpion crawls up to him the action key causes him to stamp on it. But you have to be very accurate and you don't always know quite how you did it – making it very difficult to repeat!



YEP, SUREE PARDNER! ITS THE WILD, WILD WEST

At first I really enjoyed the game but after a while it became frustrating because, try as I might, I simply couldn't get to the next level. It is good fun with really fantastic graphics and sounds, but not recommended for people who get bored easily.

Nell Greenhill

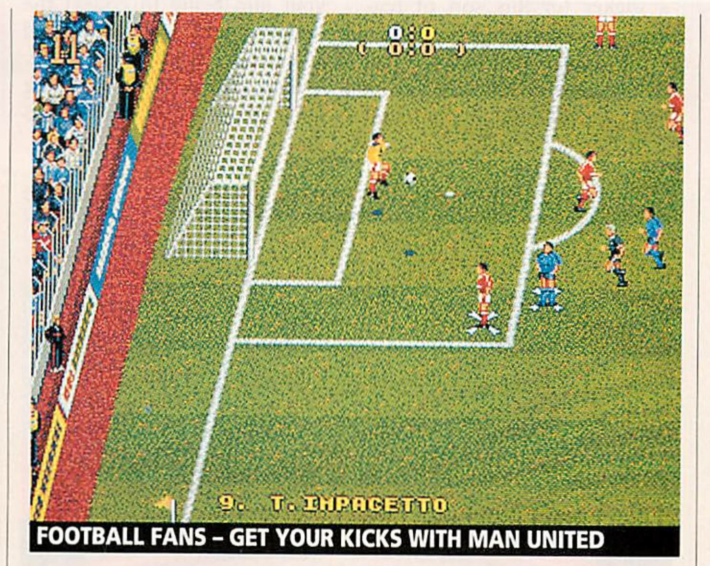
MANCHESTER UNITED EUROPE

Krisalis Software £25.99
Tel: (0709) 372290
Archimedes/A3000/A5000

Krisalis is emerging as a prolific developer of quality games software, and lucky Archimedes/A3000 owners are reaping the benefits.

Fresh from their success in the 1991 Cup Winners' Cup, that football team is back! This is a new football simulator based on the very popular *Manchester United Football Club* (see review in September 90), but with several improvements suggested by those who played the original. Apparently when the writers asked what people wanted in the new release, they were asked for a European version – and that's exactly what they've got.

This time, taking the role of Man United, you can take part in any football championship you care to mention. You name it, you can play it: the European Cup, European Cup Winners' Cup, UEFA Cup, European SuperCup or World Club Championship. All teams have their player details and club shield included. If you still have any energy left after that lot you can also play friendly matches with anyone else in UEFA, including Manchester United – which is either an amusing bug or a little known 5th division Albanian team.



FOOTBALL FANS – GET YOUR KICKS WITH MAN UNITED

As in the original, you can either concentrate on the management and running of a competition, forgetting about the arcade section, or you can do both. However, the management side of the game is not as comprehensive; this version lacks the rather nice moving icons which kept appearing in the original.

Team members now have the correct numbers on their shirts, and the player currently in possession of the ball is displayed along with other information on a large and impressive overscan screen. This is helpful, and adds to the atmosphere, but somehow the scrolling of the display and the movement of the players seems to be considerably slower than before.

Some of the nicest features of the first version have actually gone; there is no 'action replay' sequence after a goal, the little transparent map of everyone's location in the top of the screen has disappeared, and somebody has seen fit to put red in the shading of the grass on the pitch. Having said that, what is really important is the improved player control. After each kick of the ball there is a short moment in which you can apply after-touch to the shot, adding spin or chipping it over your opponent's heads. If the ball is in the air, depending on its height you can score some stunning goals with headers, volleys and sliding shots.

The penalty rules have been implemented in full this time, and you have the option to control the goalkeeper, or keep well clear and let the computer do the dirty work. Another bonus is the way two players can play on the same side – essential for every computer football game – and there is ample support for joysticks if you prefer. Keyboard control is still via the cursor keys – very uncomfortable for the seasoned Acorn gamer.

All in all, there are enough additions to justify buying the new version. Doubtless it will be a big hit with football fanatics, but I think Krisalis might have spent their time more productively, converting something completely new, rather than updating an old game. In any case, if you like football, this is for you.

Mathew Tizard

PLAY IT AGAIN SAM 16

Superior Software
Tel: (0652) 658585
BBC 5.25in, £14.95; BBC/ Electron tape, £12.95; Master Compact 3.5in, £19.95.

Following 15 successful *Sam* compilation packages, Superior Software is continuing to bundle old and new games together, selling them for the price of one. *Play it again Sam 16* contains two old Superior titles, *Hostages* and *Perplexity*, *Pipemania* from Empire and a new game called *Vertigo*.

Hostages involves a daring rescue of some dumb diplomats trapped in an embassy overrun with trigger-happy bad guys. As an SAS-style soldier you have to storm the place using snipers to terminate the terrorists. I actually prefer the BBC version to its Archimedes companion (see September 90). It's a fun game but not very flexible – the challenge exists only as long as it takes to complete each level correctly.

Perplexity is best described as a cross between *Pacmania* and *Repton*. This is because it embodies the three dimensional maze scenario of the former, combining it with the more strategic element of *Repton* – a set of puzzles. Being of medium difficulty these are my sort of standard. The graphics glare a bit and motion is less than smooth. *Perplexity* is my least favourite of the four, maybe because I just prefer arcade action to strategy.

In *Pipemania*, the object is the same as that of the Arc version – pipe some flooze. Basically, this yucky floozy stuff is leaking out of a hole and, armed with a selection of pipe shapes, you have to pipe it off elsewhere. The longer you can keep the flooze on the flow, the more points you get.

Pipemania is a very addictive arcade game although I don't think it is quite as good as it was previously hyped up to be. However, it can be played by two people, and I'm a sucker for this sort of feature; it's much more fun.

The fourth and final game is the new one, *Vertigo*. It isn't a new concept as it borrows heavily from a game called *Gyroscope*, released about six years ago, which in turn reflects the essence of my favourite arcade game of all time – *Marble Madness*. The idea is simple – you have to control a bouncy ball through a landscape of paths and valleys, your aim being to collect the diamond which can be found somewhere in each screen.



VERTIGO: A NEW, HIGH QUALITY GAME FOR THE BEEB

Sometimes the paths are quite narrow and dexterity is needed to guide the ball safely along; at other times you will need to gain enough momentum to carry the ball over a ridge or up a slope.

At one time *Vertigo* was going to be released as a separate title and remnants of this quality are plain to see, although I think it is probably happier in this compilation. *Play it again Sam 16* is as good as any.

Sam Greenhill

CHEQUERED FLAG CIS

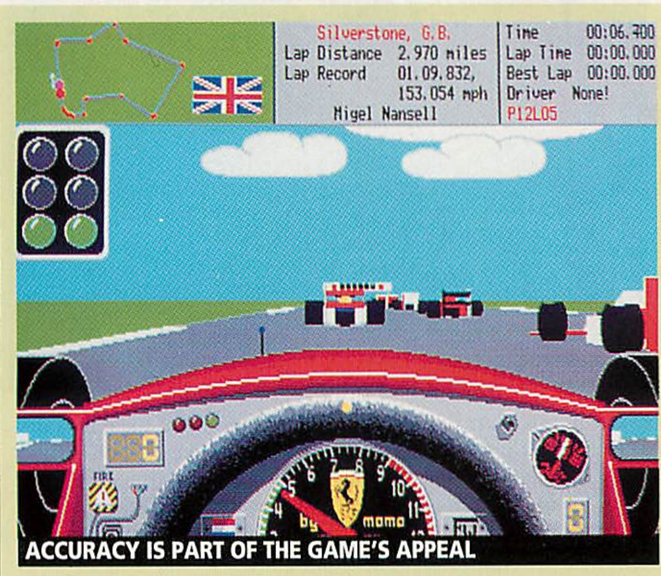
Tel: 071-226 3340
Archimedes/A3000/A5000
£25 (£15 for extra tracks to be released soon)

To date, car racing enthusiasts have seen the releases of *E-type*, *Powerband* and *Saloon Cars*. The question therefore is whether *Chequered Flag* offers anything new...

For those who read such things, a nice manual is included which, besides outlining the game, explains how to run it on a 1Mb machine and install it on a hard drive.

On starting the game, the racer sees a screenful of options on a rather psychedelic chequered background. These include three levels of difficulty represented by different styles of helmet, from the boring, white and functional, to the exciting, red and dynamic.

You load drivers from disc and select one of four tracks (Monza, Silverstone, Mexico and Hungary) from a separate submenu. Another 15 tracks will be available for those who wish to race an entire world series. There are two more menus, one to control the physical characteristics of the car, the other the mouse sensitivity and braking, via a mouse button, or pull-back on the mouse.



ACCURACY IS PART OF THE GAME'S APPEAL

Automatic control of the seven gears can be used at most levels and a speedometer can be displayed to judge cornering speeds, although this can be removed if you prefer that 'real life' feeling. All these options are clearly laid out, and individual settings can be stored on disc.

So far, so good. You start the game, be it Practice, Qualification, or Actual race. Unfortunately the 'realistic landscape' referred to in the manual seems to be missing. Certainly all three dimensions are there, but the area surrounding the track is simply one shade of green, and signposts are scarce, although the cars are drawn quite well.

The Refresh rate is nice and fast, and those lucky enough to own an ARM3 will see it even faster, although the game itself plays at the same rate – a welcome feature. When played through speakers the engine noise whistled annoyingly.

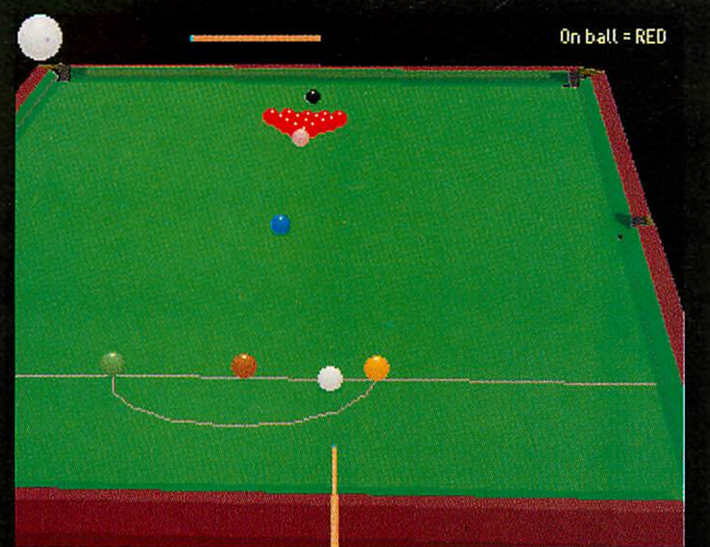
Control of the car itself varies from reasonably taxing at beginner level, to very difficult. My car tended to spin off the track rather too often, and once off it seemed hard to get back into the race. The front wheels, while turning on screen, failed to get quite far enough round. The engine cut out and had to be restarted regularly, although this may be true to life. A big rev counter is displayed centre-screen.

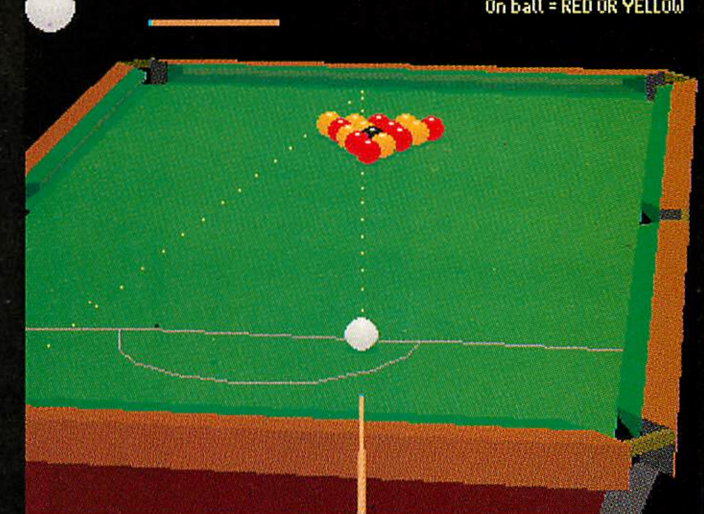
While playing this game, I kept remembering that *Saloon Cars* retails at the same price, and although a different beast, is better for 'car game' freaks. But for those wanting a more accurate simulation of Formula One racing, *Chequered Flag* may suffice.

James Weeks

BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES

Break 147 & Superpool





"Snooker & Pool Simulator Par Excellence"









'BREAK 147' and 'SUPERPOOL' are game simulations in the true sense of the word. Gone are the power meters and fixed screw and side settings of inferior simulations and in comes a cue driven by reality software.

As in the real thing your grip on the butt of the cue (represented by the mouse), the smoothness and power of your cue action and the way in which you follow through with a shot, are all deciding factors in whether a pot is successful and whether you will retain position for the next ball. The only thing that is missing is the smokey air and a pint of beer on the edge of the table, these you will have to provide for yourself!

In both games you can choose to play on a practice table where anything goes. You can position balls wherever you wish so that you can improve your potting and positional play. You can even undo unsuccessful shots so that you can try them again. When you make that incredibly fine clip into a pocket or miss by the merest fraction, you can watch an action replay of the shot from any angle so that you can either gloat or see where you made that tiny mistake that let you down.

When you feel that you are up to the task you can play a single match against a friend or against one of the sixteen computer players. Should you feel lazy you can just sit and watch whilst two computer players battle it out between themselves. Alternatively you can enter a tournament where you will have to fight your way through the preliminary rounds and on to the coveted Final.

Whilst you are playing a match or in a tournament the game will be overseen by the referee. If in snooker you are 'on' a colour as in real life the referee will indicate the ball to you that he thinks you are going for and it is up to you to let him know if he is wrong. The referee will also call when a free ball is to be given, if there is a touching ball and your score after each successful shot.

SPECIFICATIONS

256 colour MODE 13 graphics optimized for maximum speed
225k of machine code
Over 147k of high quality sampled speech and sound effects
Ball plotting accuracy of +- 0.05 of an inch on a 12 foot table
Cue butt controlled by the Mouse
Bridge hand controlled by Keyboard





BBC A3000 & ARCHIMEDES PRICE £24.95

Break 147 & Superpool" is compatible with the BBC A3000 and ALL Archimedes computers

Reviews

"The graphics are so good that certain photos of the game being played could be mistaken for the real thing. The behaviour of the balls and cue are immaculately simulated." Acorn User, Nov '91.

"All aspects of the game are staggeringly realistic, from walking round the table and eyeing up the next shot, to the trajectories that the balls follow when they move....No longer is taking a shot an unconvincing experience comprising of aiming at the ball, selecting the power level, and hitting a key....The release of Break 147 & Superpool is a giant leap from anything ever seen on our screens, to what is arguably the most realistic snooker simulation ever to be found on a home computer." Club A3000, Autumn '91.

Reviews

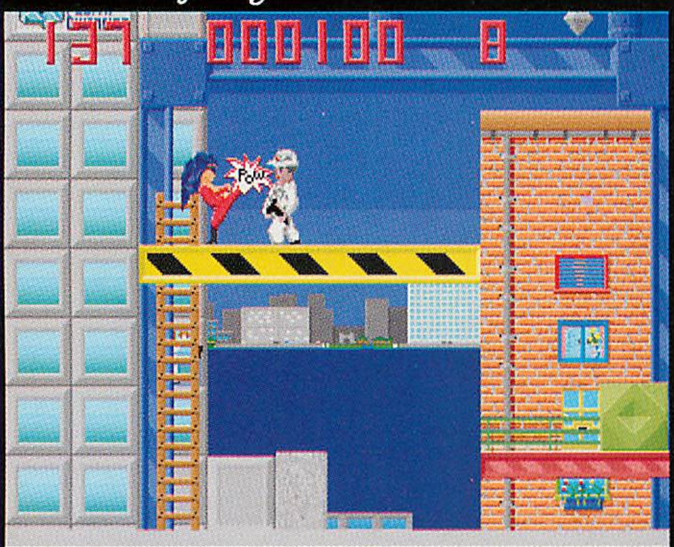
"Both Break 147 and Superpool are accurate simulations of the sport. The control method works well and the result is two very enjoyable games in one pack.... whether you are a snooker & pool fan or not Break 147 & Superpool are highly recommended." Archimedes World, Nov '91.

"The most realistic snooker sim I've ever seen." The Micro User, Nov '91.

"If you're a snooker or pool fan who wants a quality simulation for the computer then this is it.... In all, an excellent implementation of the game and I'm sure that due to the realistic 3D movement around the table, practice at Break 147 & Superpool may even improve your real game." Micronet, Sept '91.

BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES

The Exotic Adventures of Sylvia Lain



"A Young Woman with 9 Lives and a License to Kill"

The Exotic Adventures of Sylvia Lain features 256 colour mode 13 graphics and supersmooth scrolling using six planes of overlapped parallax with a frame rate of 50 Hertz. The player controls a highly dextrous young woman who can jump, somersault, roll, kick, punch and more. Over 50 frames of animation in each direction are used on Sylvia alone.

Game Outline

Your mission will take you from the latest construction sights of New York to the ancient temples of the Aztecs in South America. After some magic moments you will be whisked on to the Kennedy Space Centre and finally to the B.E.N. Headquarters hidden in a giant oil refinery somewhere in the Middle East. The gameplay is a carefully blended mixture of puzzle solving, arcade adventure, beat'em up and humour.

Mission Brief

The Nobel prize winner, Prof. Doughnut, was abducted yesterday only minutes before he was due to give his historic speech explaining his solution to the world's energy problems. It is believed that the professor has achieved room temperature fusion using the highly unstable elements found only in camel dung. However the exact formula has disappeared with the Prof. We believe that his abductors were none other than B.E.N..

Sources have reported that during the struggle, pages from the scientist's notes were left behind. Your mission is to recover all the scattered pages of the Professor's Notes. Not only will these pages provide clues to the missing formula but the cunning academic has managed to scribble maps on each of the pages giving clues to his next location.

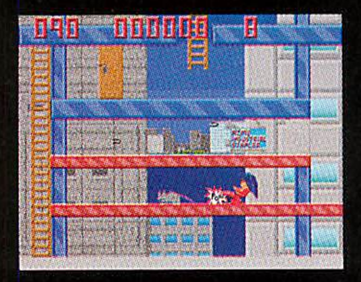
The professor was taken from outside the science faculty in New York. You will therefore be transported there immediately by an Ecologically friendly blimp. You will start your mission by recovering the lost pages at this location. Unfortunately our agents report that B.E.N. already have operatives working there. You are therefore licensed to kill and should use any means necessary, short of damaging the environment, to retrieve the missing papers and hopefully rescue the professor.

BBC A3000 & ARCHIMEDES PRICE £24.95

Release date hopefully mid Nov '91









Drop Ship



"Supersmooth Superfast Pure Arcade Action"

Drop Ship is one of the smoothest and fastest arcade games you are likely to see. It features superb 256 colour graphics, 15 increasingly large and diverse stages and an excellent stereo soundtrack.

The Year is 2020....The government proudly announces that the new fast breeder farm on the Mars colony is completely computer managed and totally safe, defended from attack at all times by a fully-automated tactical defence system.

The Year is 2030....Earth receives a transmission from the Mars colony. The radiation seems to have affected the management software at the fast breeder farm. The defence systems have gone haywire and the whole farm is rapidly approaching meltdown. If all the reactors are not shut down the Mars colony will be wiped out.

The defences include gun emplacements, artificial gravity generators, sporers and hoards of deadly aliens. What is needed is a craft which is supremely manoeuvrable, capable of great speed and possessing awesome fire power, and a pilot of extraordinary bravery to fly it. The craft is the Drop Ship. The pilot is you.

Specifications

256 colour mode 13 graphics.
Frame Rate: 50 frames per second.
Maximum objects on screen: 150 per frame.
The ship movement in the game is accurate down to 0.0001 of a pixel.

"A brilliantly addictive game which really makes you want to barricade yourself into a room for a week in order to finish it....The graphics and animation are really superb." BBC Acorn User, Jan '91.

"Compared to both Rotor and Caverns, this game has to be tops. The gameplay is even more difficult than both and the graphics and sound far better." Risc User, Dec' 90.

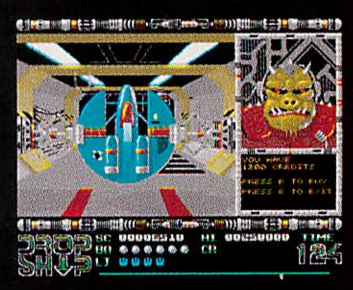
"Drop Ship is very arcade-like, with excellent graphics, the smoothest movements in town, nice sound effects and a good short demo." Archive, Jan '91.

"To sum up, a game that'll keep you hooked on your machine for many a late night with a cup of Hot Chock." Club A3000, Summer '91.

BBC A3000 & ARCHIMEDES PRICE £19.95

Drop Ship is compatible with ALL Archimedes computers









BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES

SPECIAL OFFER: If you buy The Real McCoys 1 & 2 directly from us you may deduct £10 from the total cost

The Real McCoy



"This 4 Game Collection really is The Real McCoy"

U.I.M. (R.R.P. £29.95)
U.I.M. (Ultra Intelligent Machine) is a futuristic action adventure set in the oceans. It is a huge game featuring solid 3 Dimensional graphics and digitised sound effects. You must travel the oceans in your highly expandable submarine visiting the enumerous ports throughout the ocean networks. As well as gaining combat skills you'll need to learn to trade in commodities, shares and currencies. There are over 250 missions to complete before you will find your goal - the U.I.M. - created to be almost a god.
"U.I.M. is a powerful game that justifies its higher price tag through guaranteed longer life." The Micro User

ARCADE SOCCER (R.R.P. £19.95)
Arcade Soccer really is World Cup Football action at its very best. Using an overhead view to make gameplay as exciting as possible it features everything that you could want in a football game. Corners, throw-ins, goal kicks, dribbling, shooting, passing and much more. The superb graphics and smoothly scrolling pitch are complemented by a multitude of excellent digitised sound effects and music. Furthermore Arcade Soccer is packed with options catering for up to 24 players, weather conditions, friendlies, accurate full World Cup simulation and replays to mention but a few.
"This game is excellent.... I'm not really a soccer buff, but I thoroughly enjoyed this desktop version. The micro-controlled players behave in an amazingly realistic manner." The Micro User

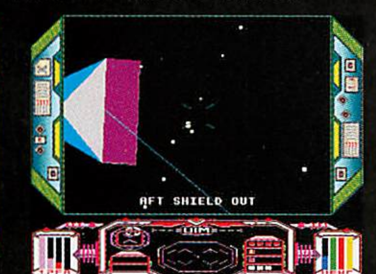
WHITE MAGIC (R.R.P. £19.95)
White Magic is a unique arcade adventure in which you control 4 varied adventurers: a Leprechaun, a Titan, a Warrior and an Enchanter. You can transform between all 4 characters at will and use their much needed special abilities. It features 32 massive action-packed levels filled with aggressive guards and trolls, haunting ghosts and spectres, curious objects to use and find, and much more. White Magic is not a game for the faint-hearted; it is a fast action game which requires fierce hand-to-hand combat and frantic weapon fire.
"Playability is good and I had to tear myself away in order to write this update review." The Micro User

QUAZER (R.R.P. £11.95)
Quazer is a fast action arcade style game with excellent music, sound effects and graphics. It has 11 incredibly detailed and varied vertically scrolling levels filled with the most amazing assortment of baddies you are ever likely to see. Quazer is classic arcade action and will test even the most competent games player to the limit.
"The power of the Archimedes is used to produce some stunning effects..." The Micro User

BBC A3000 & ARCHIMEDES PRICE £29.95

The Real McCoy is compatible with ALL Archimedes computers









The Real McCoy 2



"This 4 Game Collection really is The Real McCoy too!"

APOCALYPSE (R.R.P. £29.95)
Apocalypse places you on the surfaces of 9 varied futuristic hostile planets colonised by very varied but always ruthless enemies. In your highly advanced and extremely fast and manoeuvrable craft you must find your way around the increasingly massive planets and systematically annihilate the enemy.
"Simply, this is the best release yet for the Arc by absolutely miles. Stunning graphics, stunning sound and masses of action. Brilliant."....Risc User

HOLED OUT (R.R.P. £19.95)
Whether you're young or old, male or female, beginner or professional Holed Out has been designed especially for you. Features include: 2 contrasting courses, 1 to 6 players, excellent 3D graphics and sound effects, full set of accurately defined clubs, slice/hook capabilities etc. etc..
"...I play golf and this is the nearest thing I've seen to the real game on a computer. The graphics are very good with a large scale golfer complete with bag and trolley (and a good swing!) and the sounds are very realistic."....Archive
"...it is quite a stunning piece of work."....The Micro User

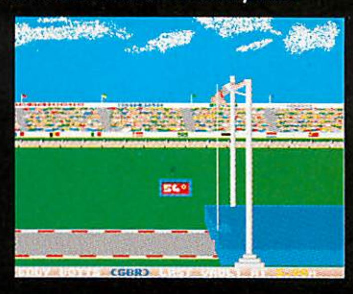
THE OLYMPICS (R.R.P. £19.95)
The Olympics can be played by 1 to 8 players and is comprised of 6 main events: Diving, Shooting, Javelin, Swimming, Canoeing and Pole Vault. It contains a superb piece of music, opening and closing ceremonies and 14 national anthems.
"Compilation packages of sporting events may have been round on other machines for ages but the first one for the Arc is every bit as good .... VERDICT: A Gold Medallist."....A&B Computing (Now Archimedes World)
"Excellent graphics .... Classy presentation .... and plenty of variety .... Should find favour with all members of the family. Definitely recommended."..... Risc User

INERTIA (R.R.P. £19.95)
Inertia is a totally original game with beautiful graphics and superb digitised sound effects and music. There are 2 massive and varied landscapes to be explored and many special tiles to be collected. Your craft floats freely around the landscapes and you must exert forces upon it to guide its speed and direction. Full colour 3 dimensional maps of the 2 landscapes can be viewed at any time and are a joy just to wander around.
".... the accompanying music is superb .... Inertia is another reasonably priced game for all ages. Highly recommended."....The Micro User

BBC A3000 & ARCHIMEDES PRICE £29.95

The Real McCoy 2 is compatible with ALL Archimedes computers









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Spitfire Fury



"A Superfast, Action-Packed, Fun & Accurate Simulation"

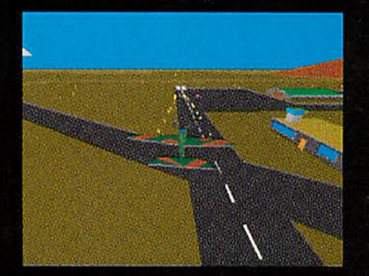
Spitfire Fury is the latest flight simulation game created by Andrew Hutchings (the author of both the Chocks Away games). In this action-filled game you take the controls of the most famous World War II fighter plane and have to tackle a range of challenging missions and tasks. The game has been designed to be an action-packed, superfast and accurate simulation with lots of fun to appeal both to the beginner and the expert.

•Superfast screen update, 12 to 18 frames per second.
•Two player option using split screen or two computer serial link.
•Computer-controlled planes fighting alongside you against the common enemy.
•Lots of varied and **action-filled** missions with over 100 enemy targets to destroy in certain cases. Such as Escorting Bombers, Bombing Raids, Torpedo Attacks on Gun Boats, Solo and Accompanied Missions, etc.. Plus of course a range of practice missions to help you get the hang of landings etc..
•Save and load game options are provided allowing you to save the game onto disk at any point and return to it later.
•A **Super Accurate** model of the plane has been created taking into account wind speed, airspeed over all control surfaces, gravity, drag and lift of each control surface etc.. This makes the plane capable of performing realistic stunts such as spins, which has not yet been seen on ANY previous Archimedes flight simulations.
•Full interaction between all planes, bullets, hills, valleys, buildings etc. This means you can seek cover by flying close to hills, buildings etc. and the enemy planes (and your fellow Spitfires) can make mistakes and shoot each other or crash into obstacles.
•256 colour graphics, digitised sound effects and complex scenery over huge expanses of land including cities, rivers, roads, hills, valleys, railways, boats, etc.
•A huge selection of viewpoints and tracking cameras are provided for you to view the action from. Plus entire flights can be recorded and watched later from any angle.

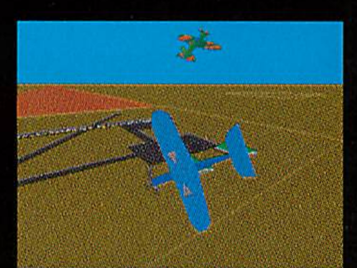
Please note that the screen shots shown are of a very early development version and therefore do not illustrate the graphics which will be included in the final version. Look out for the adverts around the release date for screen shots of the final version.

BBC A3000 & ARCHIMEDES PRICE t.b.a.
Release date hopefully February '92









X-Fire



"Highly Addictive Classic Arcade Action"

X-Fire is an exciting new arcade game which represents a welcome return to traditional arcade values.

Pit your wits and reflexes against hordes of menacing aliens within a high tec battle arena. At your disposal is an awesome array of fire power that is all that stands between you and certain destruction. Both cunning and dexterity will be required to prevail against increasingly sophisticated and dangerous opponents.

Collect bonuses to aid you in your task and augment your ship's capabilities. Regen Bombs, Split Bombs, Shield Reserves and Zaps are just a few of the bonuses available.

With crisp graphics and addictive arcade action, X-Fire combines the best qualities of classic arcade games with the advanced audio and visual capabilities of the Archimedes to create the ultimate high speed shoot'em up.

Specifications

256 colour MODE 13 graphics
Highly optimised custom graphic routines
Up to 200 objects on screen
Over 300k of high quality sampled sound

X-Fire is an essential purchase for any serious game player in search of a lasting challenge.

BBC A3000 & ARCHIMEDES PRICE £24.95
Release date hopefully mid Nov '91









Pandora's Box





"State of The Art Arcade Adventure"

An intriguing blend of classic puzzles and full-blooded arcade action. Over 200 screens of stunning artwork and game play of the highest quality will appeal to the dedicated adventurer or arcade fanatic.

Prologue

Since ancient times a fastened box has symbolised the danger of our curiosity. This box has been opened and an entire kingdom has been poisoned by the evils unleashed.

The beast that lurked within is free and seeks the souls of men, possessing them and devouring them at will. Feeding upon misery, it profits by treachery and corruption, and in doing so brings the burden of its evils upon the land.

As the finest sorceror in the kingdom you must overcome the black magic and confine the curse once again to the only dungeon strong enough to contain such furious depravity - Pandora's Box.

Quest

The powerful Panmetric graphics system allows you explore complex rooms and stunning landscapes whilst still having plenty in reserve to handle frenzied battles.

At first only armed with a keen wit you must acquire knowledge and magical weapons as the adventure gives way to arcade action. Exploring the length and breadth of the land you could conquer a world of magic or die in obscurity.

Technical Information

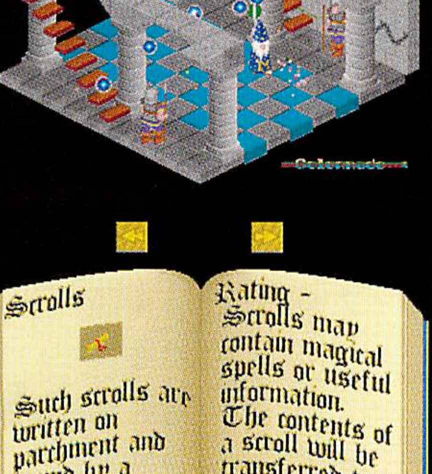
Frame Rate	25 FPS
Object Code	150k of Handwritten Arm Code
Graphics	Over 1000 sprites totalling 3Mb of graphics 256 colour, mode 13 graphics Panmetric graphics system
Sound	Digitally sampled sound effects
Computer	Any Archimedes with 1Mb or more

BBC A3000 & Archimedes Price: £24.95











Roll of Honour

Rank	Name	Score	Done
Mayor	Merlin	2500	25%
Yeoman	Pandora	1500	15%
Beggar	Robert	1000	10%
Tramp	Zippy	500	5%
Leper	Gordon	0	0%

Awarded by
Arthur Rex

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Nevryon



"Anybody can be an Artist with ARCtist"

This superb painting program has been designed to be incredibly easy to use and yet totally jam packed with features. Developed with help from educational specialists and professional graphic artists, ARCtist is ideally suited to home, school and professional users.

Just a few of ARCtist's features include:

- Full screen 256 colour mode 15 editing. RISC OS compatible.
- Intelligent spray gun that 'shades' rather than just plotting random dots of colour.
- Rotation up to 2870% faster than !Paint.
- Internal handling of up to 30 sprites with auto sprite naming, sorting, grabbing, cutting, instant masking, rotation, scaling etc..
- Masking tape option lets you mask any part of the screen for spray gun work, then lift off later to reveal what was underneath.
- Zoom around the screen at high speed and edit with pixel accuracy.
- Several brush types available with variable size.
- Undo option undoes the last change you made to a drawing, in case of mistakes.
- Special effects to distort, detect edges, trace with colours, trace with sprites, swap colours, dither colours, blur, anti alias etc. etc..
- Special proportionally spaced outline fonts that don't require any memory in the font cache. Put a rectangle around the area you want the text to fit and ARCtist will scale it to fit.
- Rectangle copy, move, rotate and scale. Also, accurate shape cut copy, move, rotate and scale tools to slice out the exact part of the screen you want.
- Sprite animation with built insequence editor, offset generator & flight path editor.
- Load, edit and save fill pattern files. ARCtist fill patterns are twice the size of normal ones.
- Two user definable drawing brushes, can be defined directly or grabbed from anywhere on the screen.
- Several hundred Kbytes of clip art included.

BBC A3000 & ARCHIMEDES PRICE £24.95

ARCtist is compatible with ALL Archimedes computers









"A Superlative Action-Packed Arcade Game"

During The First Great Space War of 2100 reserves of titanium, the chief metallic element involved in ship construction, begins to run out throughout the known universe. Only the human-colonised planet - Nevryon - has large reserves. You must destroy all alien forces which are attempting to take over Nevryon.

To succeed you must complete 4 very different missions: destroy the alien bases on the Surface and in the Caves of Nevryon, plus destroy from within both the Alien Battlecruiser and the huge Alien Beast. The aliens will attempt to attack and confuse you with every type of vessel they possess.

You begin each mission with a standard short range V5 Fighter. Anything larger would undoubtedly mean detection and death before you could even begin. However, once in the thick of the action, your fighter is able to collect and use a large array of extra weaponry and shielding. You will be on your own but you will not be forgotten....

Specifications

Over 1.5 Megs of 256 Colour Mode 13 Graphics. Over 60 Objects On Screen at Once
25 Frames/Second Scrolling and Animation. 6 Levels of True Parallax Scrolling
Big Sprites. 4 Channel Sound Played at 20kHz
6 Pieces of Superb Stereo Music. Multi-Channel 'Live' Stereo Sound

"Fans of strategy games won't like this one, but for the masses who enjoy total alien genocide, dushdi graphics and equally appealing sound, this game must surely be worth a mention on your list to Santa. I wholeheartedly recommend this game as the definite shoot'em up for the Arc..." Club A3000, Summer '91.

"Nevryon features the best graphics and sound I have ever come across. All of the superb sprites are packed with amazing detail and the animation and scrolling are completely flicker-free." Micro User, Nov '90.

"The 4th Dimension have come up trumps with another classic...Graphics are superb...The number of animated objects, missiles, scenery and details will put many ST and Amiga to shame with the sheer power of the ARM chip." Micronet, Aug '90.

BBC A3000 & ARCHIMEDES PRICE £19.95

Nevryon is compatible with ALL Archimedes computers



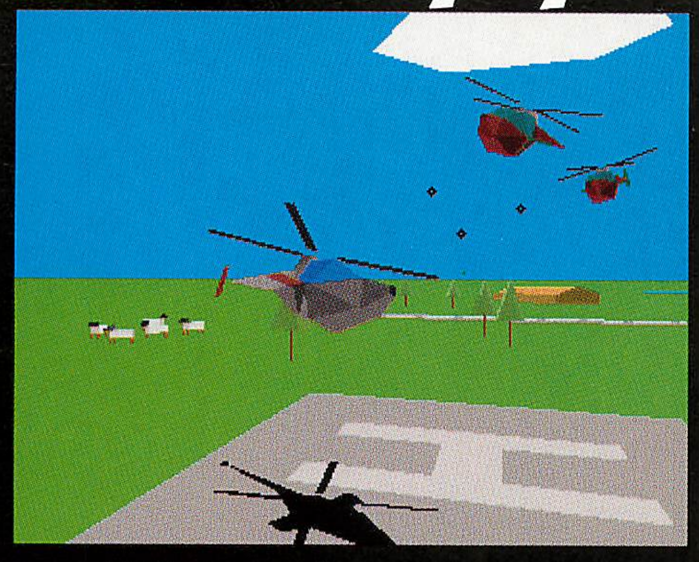


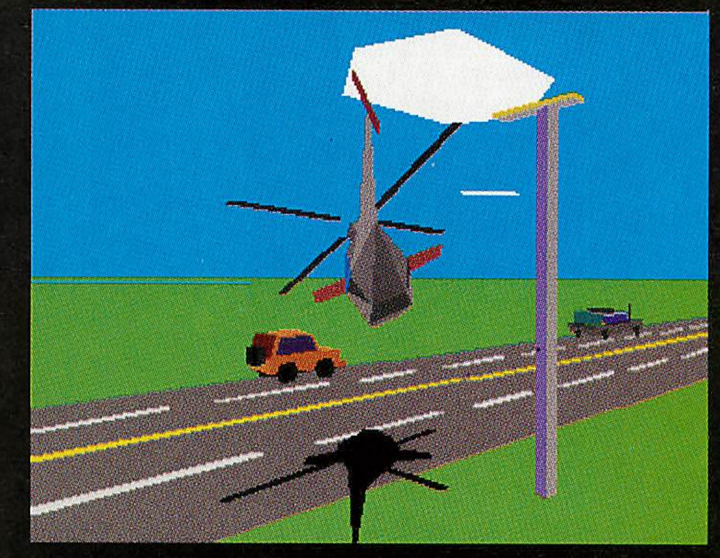




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Chopper Force





"Superfast Action-Packed Chopper Sim"

Gameplay

The year is 2023 and advanced weapons' systems such as laser-guided munitions and stealth technology has fallen into the hands of a terrorist organisation.

You pilot a highly advanced helicopter on a number of varied and increasingly challenging missions to attack the terrorists, 'accompanied' by NEXT GENERATION uncannily realistic 3D graphics.

Hardened flight simulator addicts who may no longer find it challenging to pilot a plane will just love learning how to master the controls of the advanced and highly manoeuvrable military helicopter in Chopper Force. And in 2023 there are new super high technology 'smart' weapons to be mastered!

In Chopper Force there are missions that you could never dream of attempting in a plane simulator - such as picking up military hardware with a rope and transporting it to where it is needed as quickly as possible or conveying important intelligence information from the top of a skyscraper in one city to where it is vitally needed in a neighbouring city.

Experience a feeling of total power by hovering a safe distance from a convoy supplying the terrorists and picking them off from a safe distance with your smart missiles. Knock out communication lines going into and out of their HQ to totally cut them off. You will come across their own advanced helicopters, jets, tanks, laser-guided missiles, the dreaded flak, etc..

The final highly tasking mission involves attacking the enemy HQ to totally annihilate the terrorists.

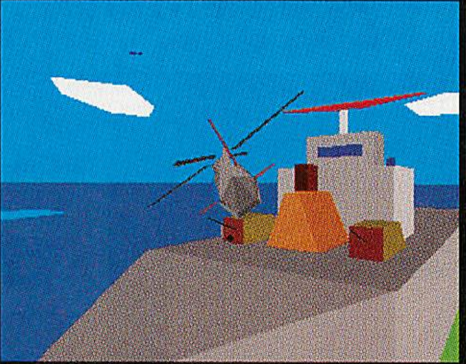
If you can get this far then you are truly worthy of the Chopper Force.

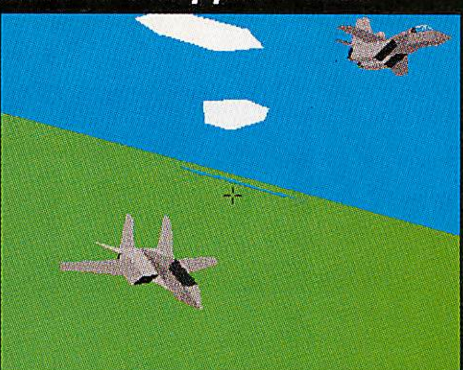
Specifications

Graphics: 256 colour mode 13 graphics
Frame Rate: Up to 25 frames per second
Polygons per frame: Up to 500
Polygons per object: Up to 80

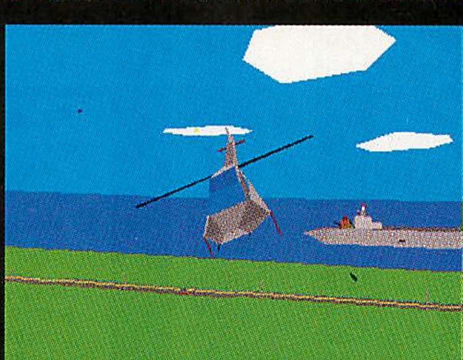
BBC A3000 & ARCHIMEDES PRICE t.b.a. Release date hopefully March '92
The screenshots shown were taken from a young version of Chopper Force







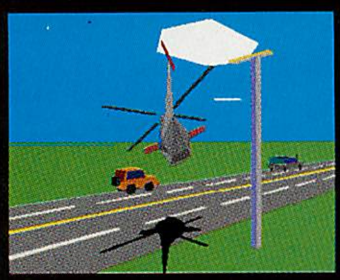






The Fourth Dimension

SPECIAL OFFER: If you buy 3 or more products directly from us you may deduct £10 from the total cost


Chopper Force (early version)


Enter The Realm

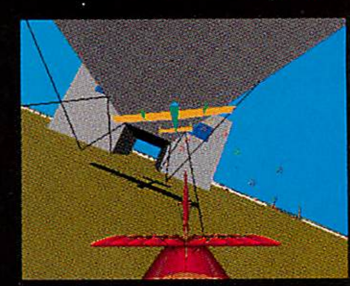

Saloon Cars


The Exotic Adventures of Sylvia Lain


Pandora's Box


Break 147 & Superpool


Grievous Bodily 'ARM


Chocks Away Extra Missions

ACORN BBC A3000 & ARCHIMEDES SOFTWARE

The following software is compatible with the BBC A3000 and ALL Archimedes computers

ARCADE GAMES

Grievous Bodily 'ARM *(Hopefully late Nov.'91)*	24.95
Cataclysm *(Hopefully late November '91)*	24.95
X-Fire *(Hopefully mid November '91)*	24.95
Boogie Buggy *(Arcade Graphics & Gameplay)*	24.95
Nevryon *(Unbelievable Graphics & Gameplay)*	19.95
Inertia *(Isometric Arcade Action)*	19.95
Apocalypse *(3D Mega Game - 9 Planets)*	29.95
Drop Ship *(Superfast Arcade Action)*	19.95
Arcade Soccer *(World Cup 1-24 Players)*	19.95
The Olympics *(6 Varied Events - 1-6 Players)*	19.95
Quazer *(Furious Arcade Action)*	11.95

EDUCATIONAL SOFTWARE
(from Triple 'R' Education)

Picture Book	19.95
Money Matters	19.95
Data Word	19.95
Target Maths	19.95
Converta-Key	19.95

3D SIMULATIONS/GAMES

Chopper Force *(Hopefully March '92)*	t.b.a.
Spitfire Fury *(Hopefully February '92)*	t.b.a.
Saloon Cars *(The Ultimate Driving "Game-ulation"!)*	24.95
Break 147 & Superpool *(Incredibly Realistic Snooker and Pool Simulator)*	24.95
Chocks Away *(Biplane Sim. for 1 or 2 Players)*	24.95
Chocks Away Extra Missions *(26 Extra Missions plus some Superb Enhancements)*	19.95
Chocks Away Compendium *(Chocks Away + Chocks Away Extra Missions)*	39.95
Powerband *(Superfast Formula 1 Grand Prix)*	24.95
E-Type Compendium *(3D Classic Car Racing)* *(E-Type + Extra 100 Miles + Designer)*	24.95
Holed Out Compendium *(3D Golf 1-6 players)* *(Holed Out + Extra Courses Vol.s 1 & 2 + Designer)*	24.95

GRAPHIC ADVENTURE

The Wimp Game *(Unique Graphic Adventure)*	19.95

ARCADE ADVENTURES

The Exotic Adventures of Sylvia Lain *(Release date hopefully mid November '91)*	24.95
Pandora's Box *(Stunning Graphics & Gameplay)*	24.95
Enter The Realm *(Supersmooth Arcade Action)*	24.95
Pysanki *(Futuristic Arcade Adventure)*	19.95
Man-At-Arms *(Medieval Arcade Adventure)*	19.95
U.I.M. *(Massive 3D Action Adventure)*	29.95
White Magic *(Magical Arcade Adventure)*	19.95
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The Real McCoy *(4 Game Compilation)* *(U.I.M., Arcade Soccer, White Magic & Quazer)*	29.95
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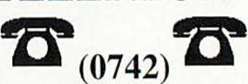
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ARCticulate *(The Animated Speech Synthesizer)*	24.95

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Title	BBC B & Electron Cassette	BBC B & Master 5¼" Disc	Master Compact 3½" Disc
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Holed Out *(3D Golf for 1 to 4 Players)*	12.95	14.95	15.95
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White Magic *(Magical Arcade Adventure)*	9.95	12.95	13.95
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The Art Studio *(Easy to Use Art Package)*	9.95	12.95	---

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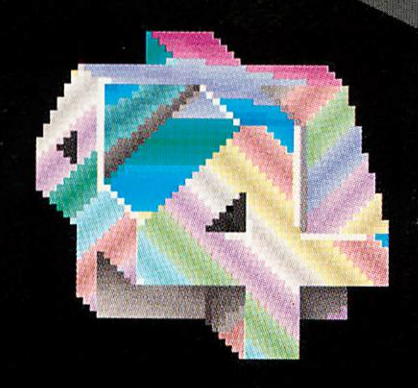
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THE FOURTH DIMENSION

Software Catalogue

THE Archimedes Games Specialists



BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES

Grievous Bodily 'ARM





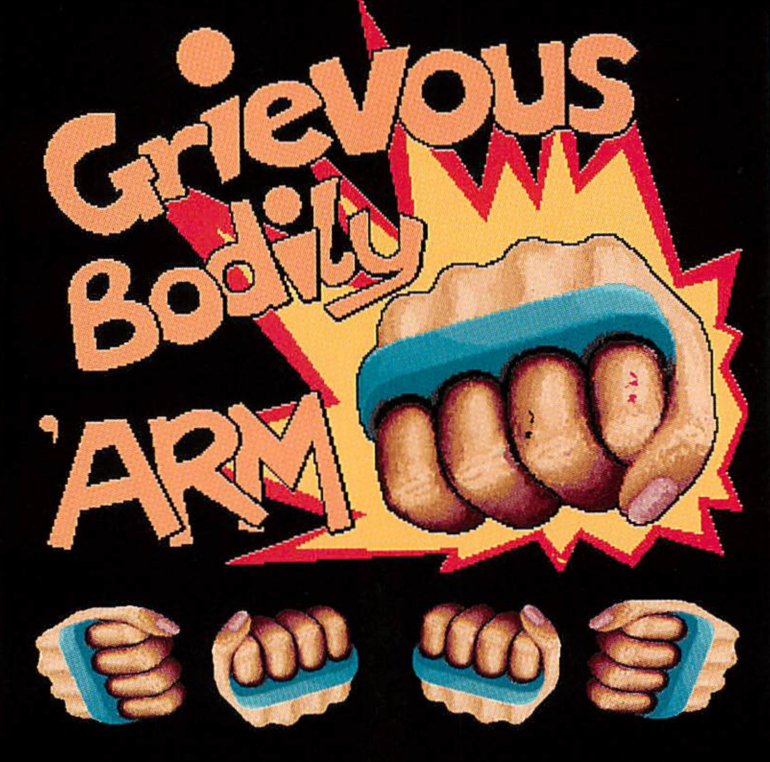
"A Brutal Uninhibited Arcade Beat'em Up!"

The Plot

An evil scientist discovers a cheap and easy way to manufacture vast quantities of illegal narcotics. His intentions - to turn cities full of people into junkies, all dependent on his supplies.

Mass addiction spreads throughout the city within days - like a deadly plague. Gang violence, looting, mugging - people will do anything to get their next fix, your only chance for survival is to get the crazy scientist yourself and make sure he will never be able to make any drugs again.

Punching, kicking - finding weapons along the way, you fight through hordes of junkies in streets, warehouses and sewers until you reach the mad scientist's laboratory where you must 'deal with him for good'.



The Development Team

Comprises a Software Engineer and Graphic Artist who previously worked for years in the American arcade and home console markets, writing ultra-playable games that have sold around 1 million copies worldwide. Now writing for the technically superior Acorn RISC based range of computers.

Techno Stuff

Frame Rate	*50 Frames/Second Constant*
Object Code	*Handwritten Arm Code and Basic*
Graphics	*Over 1.5 Mbyte. High Speed Custom Written Graphics Handlers*
Sound	*Digitally Sampled*
Computer	*Archimedes with 1 Mbyte or more*
Inputs	*Keyboard or Joystick*

BBC A3000 & ARCHIMEDES PRICE £24.95 Release date hopefully late November '91



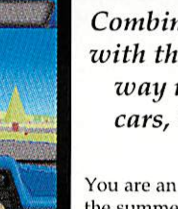


Saloon Cars





The **Ultimate** Driving "Game-ulation"!



Combining the best features of a fast and furious racing game with the realism of an accurate driving simulator. Work your way up through the leagues, buy extra features and faster cars, to become the Saloon Car Racing Driver of the Year.

Game Plot

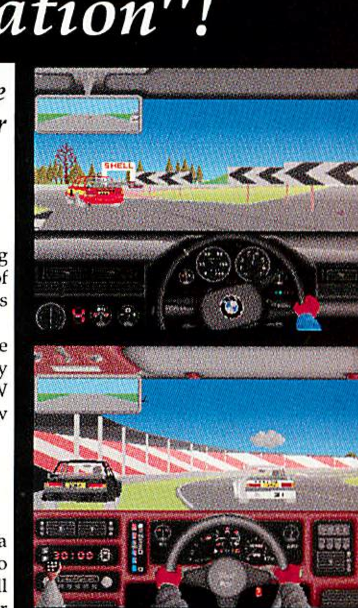
You are an amateur racing driver just starting in the field. You race at weekends during the summer, and have a full time job at the office all week* which helps to pay some of the gargantuan bills you incur at weekends! You have recently blown your life savings on an Astra GTE and entered a season of races...

With your Astra you compete in class C against the other Astras and, if you prove yourself worthy by working your way up through the league, you may eventually manage to get sponsorship to race in class B. At this point you will need to buy a BMW M3, built to your exact specifications and the manufacturer's custom price. After a few more seasons you may even reach the exalted heights of a Cosworth Sierra...

*It is beyond the scope of this program to provide a realistic simulation of a full time office job!

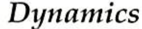
Dynamics

The mathematical simulation of the dynamics of a car in motion was set up by a professional physicist. A Classical Newtonian model is used for the transmission and to model the motion of the wheels on the road in both regimes of sliding. The result of all this is a program realistic enough to allow front, rear and four wheel slides, Understeer and Oversteer and of course handbrake turns.



Graphics

The game features 256 colour, mode 13 graphics, designed by a professional artist. The view is a first person, cockpit view from which you can see the road ahead, the rear view mirror and the instruments. The main view features totally customised handwritten ARM code graphics routines which were necessary to maintain the superb frame rate and create a view previously undreamed of. The courses (Silverstone & Brands Hatch) feature bridges, stands, gravel traps, barriers, the pit lane, and even the man with the chequered flag. Of course there are many other features, but we think it's better to save most of them to be a surprise!





Technical Information

Frame Rate	*Up to 25 FPS*
Object Code	*250k of Handwritten Arm Code*
Graphics	*256 colour, mode 13 graphics*
	Handwritten, custom graphics routines
Sound	*Digitally sampled sound effects (Naturally!)*
Computer	*Any Archimedes with 1Mbyte or more*
Inputs	*Mouse, Keyboard or Joystick*
Serial Link	*This option will be supplied on a separate disc*

SILVERSTONE



BBC A3000 & ARCHIMEDES PRICE £24.95

"Saloon Cars" is compatible with the BBC A3000 and ALL Archimedes computers

Reviews

"The graphics are very impressive - 256 colours with the screen updated at a very fast rate. ....technically Saloon Cars is a breathtaking piece of programming and a stunningly accurate simulation." The Micro User, Sep '91.

"...Saloon Cars uses real-time 3D graphics to produce a game that the Amiga can't hope to match (and so far as PCs are concerned you'd probably need either a 33MHz 386 or even a 486!)....The game features 256 colours (mode 13) and absolutely stunning animation. Make no mistake: the speed and smoothness of this game has to be seen to believed. It's the first simulation I've seen on a computer (i.e. outside of mega-expensive arcade machines loaded with custom chips) that actually feels like you are in a car!" Syracuse, Summer '91.

Reviews

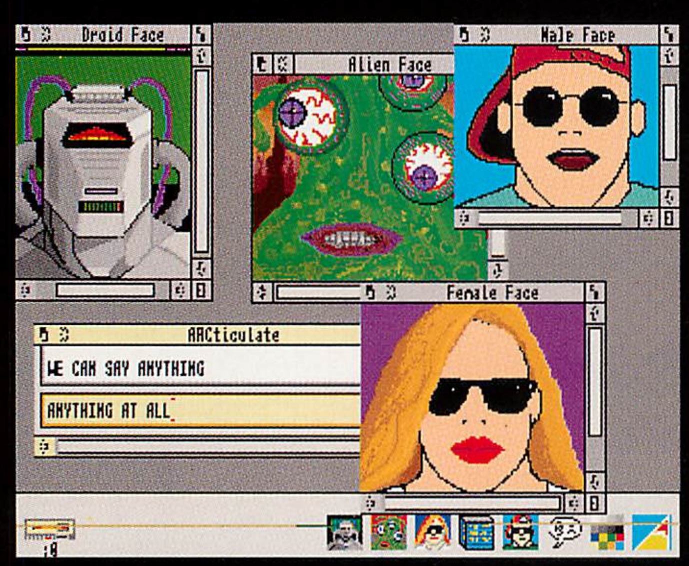
"Once you actually start racing for the first time your jaw will need chiselling off the floor - you cannot help but be astounded at the gameplay.....The cars and courses are realistic down to the millimetre (well, nearly!).....To be honest, I would not have imagined that with the amount that goes on, the display would have scrolled so smoothly. You simply need to see it to believe it!" Club A3000, Summer '91.

"For all you driving and/or racing enthusiasts this is the one you've been waiting for. It's also fine for anyone who just wants a good game." Acorn User, Oct '91.

"...if you are looking for a realistic simulation coupled with a fun arcade game and can't afford the running costs (or repairs) of a Cosworth, then Saloon Cars is a must." Micronet, July '91.

BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES

ARCticulate



"The Animated Speech Synthesizer"

This unique and revolutionary speech synthesizer actually has faces that talk to you and to each other. You can choose from 4 main faces and voices - male, female, alien or droid - thereby truly bringing your computer to life!

ARCticulate works in the desktop environment allowing full multi-tasking with word processors etc.. ARCticulate will read any documents that you have written or you can insert jokes, questions etc. etc..

You can alter the pitch, speed, volume and of course voice, during and after any sentence, thus allowing the faces to even talk to each other. The Dictionary supplied is a RISCOS application and is simplicity itself to use. It holds up to 600 words in any file and you can have as many files as you wish - ideal for specialist subjects.

Also included in the package are a selection of jokes, some amusing noises to attach to desktop events, a provisional dictionary file and a superb demonstration program showing you just how articulate Arcticulate is!

FACTFILE

- 4 animated faces able to cover all mouth positions
- 4 meticulously sampled voices which can say absolutely anything you want
- All faces and voices can be installed together
- An individual face and voice can be installed in less than 120K
- Very easy to use dictionary application with up to 600 words per file and limitless files
- Reads text files, word processor documents and can be easily used with your own programs
- Entertaining Joke program, Demo program and Funny Noises program also included

"...ARCticulate produces clearer and more natural speech than any of its rivals. It also has talking heads." Archive, Sep '91.

"...the actual quality of the speech is excellent - I have never heard computerised speech sound so real.... The male and female voices actually sound like real people....ARCticulate is a fun program, and demonstrates high quality speech on the Archimedes." Syracuse, Summer '91.

BBC A3000 & ARCHIMEDES PRICE £24.95

ARCticulate is compatible with ALL Archimedes computers

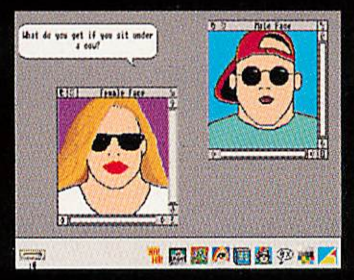
ARCticulate



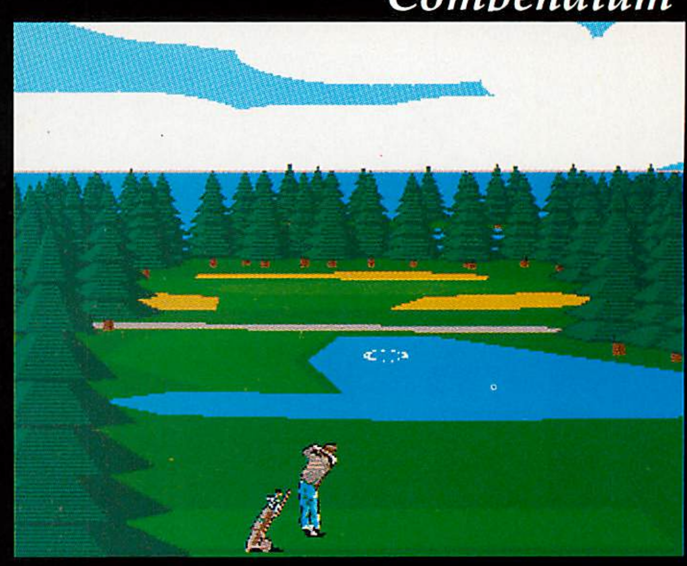








Holed Out
Compendium



"An Immensely Playable Golf Game for 1-6 Players"

Includes: The Original Holed Out

This superbly enhanced version really shows the power of the Archimedes at its best. The game is completely mouse driven and features atmospheric digitised sound effects to convince you that you are really playing golf.

- 1 to 6 players. • 2 contrasting 18 hole courses.
- 4 skill levels for beginner to professional. Learn to play without worrying about the wind, bunkers or rough.
- Realistic ball flight paths. • Slice and hook capabilities.
- Variable wind on each hole - every round is unique.
- Full set of 14 clubs with accurately defined performances. You must consider your lie, the distance required, the wind conditions, the height required and the degree to which the ball will bounce and run along the ground.
- Bunkers, trees, water and variable rough.
- Constantly updated full scoreboard. • Matchplay or strokeplay options.

"I play golf and this game is the closest thing to the real game on a computer. The graphics are very good with a large scale golfer complete with bag and trolley (and a good swing!) and the sounds are very realistic." ARCHIVE, June'89.

".....a great game." The Micro User, August, '89.

& The Holed Extra Courses 1 & 2

These feature 4 extra 18 hole courses which have been meticulously created to test your golfing skills to the limit.

& The Holed Out Designer

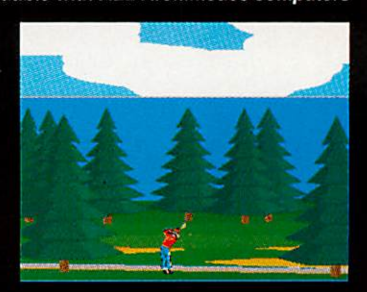
Create your own courses with this easy to use yet highly sophisticated hole designer. Its flexibility allows you to define all aspects of the holes from their pars to the size, shape and position of the holes.

"The Holed Out Designer is very easy to use and it makes a perfect complement to the original game." The Micro User, Jan'90.

BBC A3000 & ARCHIMEDES PRICE £24.95

The Holed Out Compendium is compatible with ALL Archimedes computers



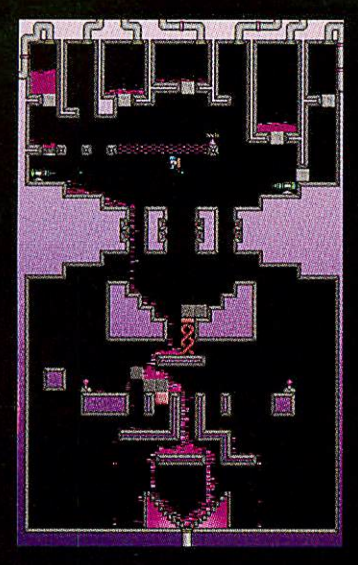




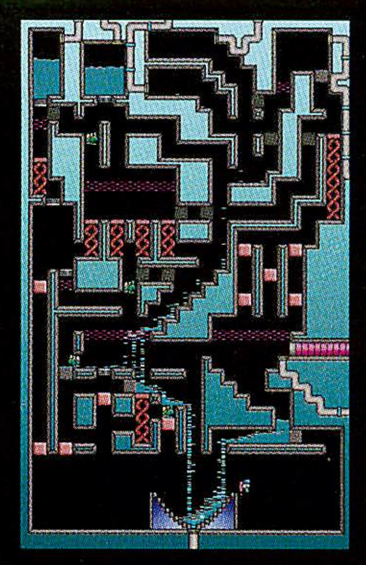


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Catalysm







"A Stunningly Original and Watery Game!"

Scenario

Unable to escape the gravitational pull of a truly massive planet, the cosmic exploration ship hurtles ever nearer to the planet's surface. The moment of impact fails to happen. Horrendous creaking sounds, and the faintly audible sound of running water provide sufficient evidence to enable the ship's supervisor to eventually grasp the situation. Submerged beneath a vast and alien ocean, the *Orcna* is gradually disintegrating...

Game

Playing the part of the ship's supervisor, your task is to expel water from different sections of the ship via hydraulic pumps, to give the ship's semi-organic outer shell time to repair itself. The water enters each section through a network of pressure-relieving pipes, and must be directed towards a collecting vessel using several manipulating blocks. This must be accomplished within a time limit, before the pressure becomes too great.

The various sections of the ship contain numerous features to further complicate your task. Pressure valves, dissolving blocks and filters all affect the flow of the water. Additionally, the water's presence has disrupted the ship's computer, which is now intent on terminating your existence using the on board weapons' systems, although it is possible to acquire fire power of your own.

As the *Orcna* is an exploration ship, it contains many strange alien life forms, gathered from distant galaxies. The now chaotic computer has taken upon itself to release these creatures from their confining cells, and the aliens are rampaging freely throughout the ship. Needless to say, several of these species are particularly unpleasant. Your task is to prevent the disaster that would occur were the *Orcna* to succumb to the icy water that is flooding into the ship. Your task is to prevent a cataclysm.

Program

Cataclysm is a stunningly original and unique game. As well as incorporating conventional sprite and pixel plotting techniques, a cellular automata is employed to generate realistic fluid motion. A simple set of rules is applied to each individual droplet of water, with hundreds of droplets forming a dynamic fluid which flows around the various on-screen objects. The water will adopt the shape of any container, and even exhibit tiny air bubbles. Later levels incorporate extended fluid routines to create frothing acid, and coloured liquids that mix on contact. Optimised sprite routines allow the presence of various aliens and over one hundred parabolic particles and bullets, all moving extremely smoothly at a high frame update rate.

Guiding the water through the various features and into the collecting vessel requires logical thought, coupled with arcade reflexes. Cataclysm successfully combines both puzzle solving and shoot'em up elements to create an immensely playable and enjoyable game.

Technical Specifications

50 Hertz cellular automata generates realistic fluid motion.

Over 1000 individual droplets of water on screen simultaneously.

Water, sprites and over a hundred independent particles and bullets updated at 50 frames/second.

256 colour graphics, 320*640 pixel playing area with superbly smooth animation and scrolling.

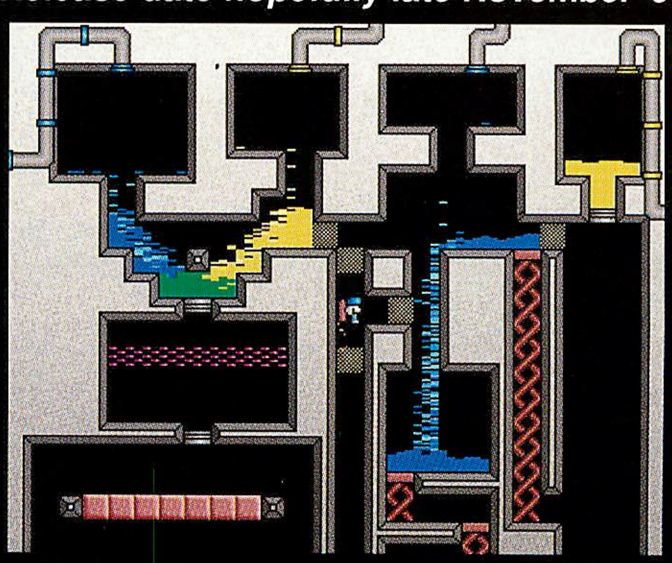
Over 500k of superb sampled music and sound effects.

40 increasingly complex and difficult levels.

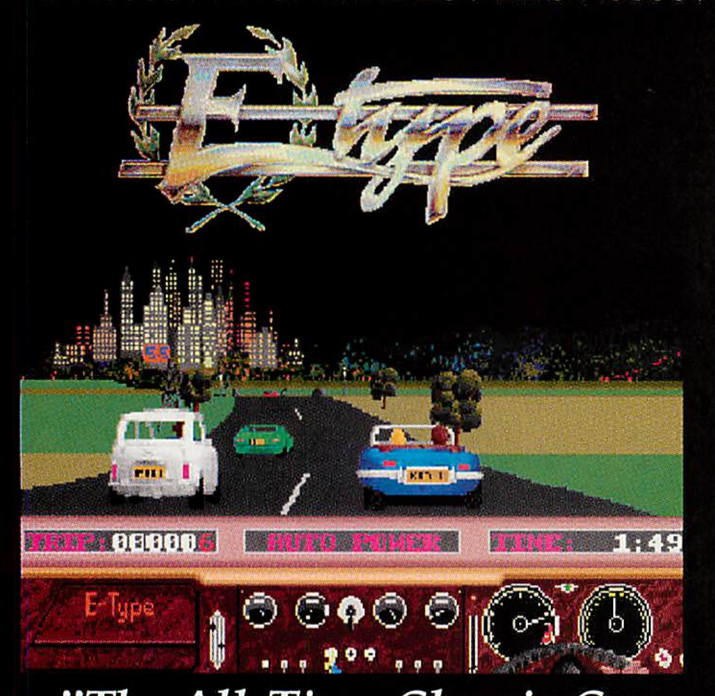
Numerous features including valves, dissolving blocks, remote control doors, drip-valves, linear and parabolic guns, increasingly available fire power, various types of aliens, acid, coloured liquids, guided bullets etc...

BBC A3000 & ARCHIMEDES PRICE £24.95 Release date hopefully late November '91





BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES



Boogie Buggy



"The All-Time Classic Car The All-Time Classic Game"

The "E-Type Compendium" includes:

The Original E-Type

Take control of £70,000's worth of gleaming "E-Type" and head off for the drive of a lifetime. Hear the digitised roar of the 5.3 litre 12 cylinder engine as you tear along lanes, roads and motorways at speeds over 150 m.p.h..

"E-Type" takes racing simulations into the world of 32 bit RISC processing to bring you a game of a quality that is not often found even in the arcades.

If you are new to car driving you can take the very easy to drive automatic for a spin but experienced drivers can optimise performance using the faster 5 speed manual.

There are hazards galore in the 5 varied scenarios including other cars, roadworks, pedestrians, trees, rocks, bushes, oil spills and many more.

"On the Archimedes the illusion of speed is terrifyingly real and the way the landscape moves in three-dimensional perspective is a joy - a stunning experience." The Independent, Dec'89.

"This is a superb game....the tracks are fantastic." The Times Dec'89.

"No race game on any other machine looks as good." The Times Educational Supplement Dec'89.

& The E-Type Extra 100 Miles

This consists of 100 extra miles of very hilly and hazardous roads. They will test even the best drivers to the limit.

& The E-Type Designer

This highly advanced but simple to use designer allows you to design your own tracks. It is enormously flexible to produce an endless variety of tracks to challenge you and your friends.

"The perfect complement to E-Type." The Games Machine Feb'90.

"A Totally Original Game with Stunning Animation"

Boogie arrives at Dodge City to find that the Evil Monster Lord has taken control and set about converting power-ore, which is extracted from a mine in the centre of the city, into evil-ore, which he is using to transform all the good in Dodge City into evil. As the Evil Monster Lords' power increases, he proceeds to turn Dodge City into a stronghold for creatures of darkness and other evil monsters, and plots to take control of Bumper World. Boogie has not yet been influenced by the evil-ore and so it is up to him to thwart the Evil Monster Lords' plans.

To do this Boogie must travel across Dodge City counteracting the effect of the evil-ore in each zone by collecting lumps of power-ore, and returning them to the mine. Boogie must also destroy each of the Ore Conversion Plants (O.C.P.'s), before finally meeting the Evil Monster Lord in the Ore Core.

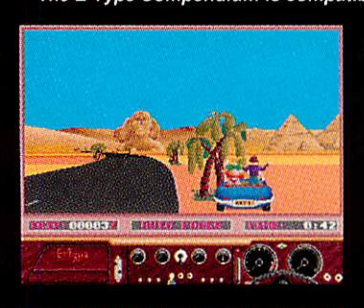
"The first thing you notice about Boogie Buggy is that the graphics are gorgeous. The game uses the border as well as the main playing area by about 40% and the effect is stunning." BBC Acorn User, Sep '91.

"Boogie Buggy sets new heights in presentation, the whole program is a feast for the eyes. Take a look at the lily pond for example, it's breathtakingly good....Boogie Buggy is totally original, packed with action, great sound, catchy music and above all incredible graphics and animation....it's brilliant." Syracuse, Summer '91.

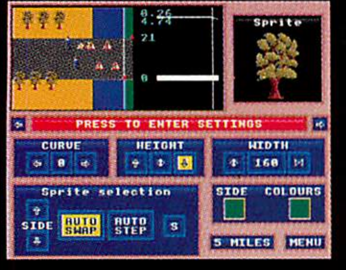
"Coming on three discs, it's certainly a vast game and only just runs on a 1 megabyte machine...Graphics are probably the most pretty and colourful I have seen on an Archimedes, with plenty of plants, flowers and wildlife, all well-drawn in cartoon style artwork...On the whole it's a well thought out and designed game which is addictive too." Micronet, July '91.

BBC A3000 & ARCHIMEDES PRICE £24.95

The E-Type Compendium is compatible with ALL Archimedes computers



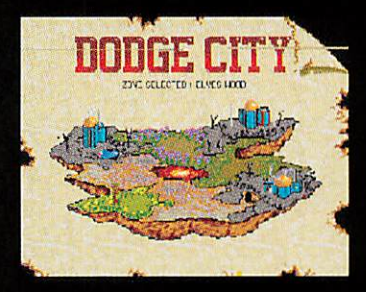






BBC A3000 & ARCHIMEDES PRICE £24.95

Boogie Buggy is compatible with ALL Archimedes computers





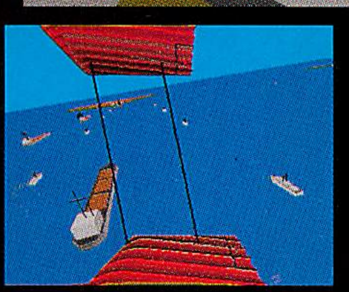


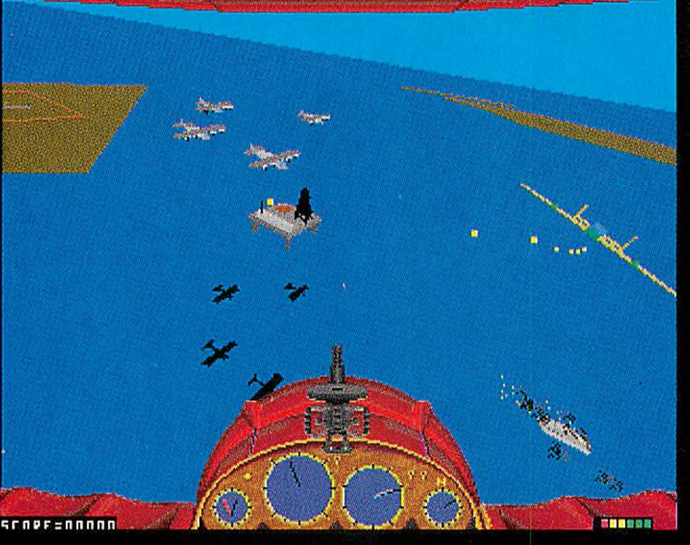


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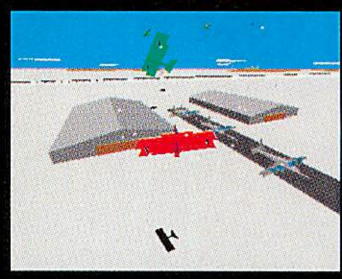
Chocks Away EXTRA MISSIONS











CHOCKS AWAY

This new upgraded Mark II Chocks Away with supersmooth animation really is flight simulation the way you've always wanted it. It has everything for the beginner and the expert:

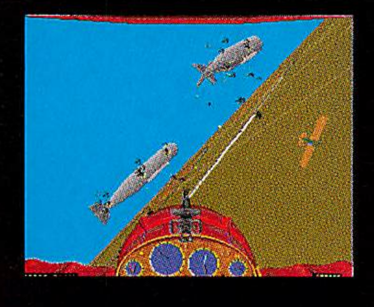
*Beautiful 256 colour graphics and 'nerve shattering' digitised sound effects
*Easy to fly, yet highly manoeuvrable bi-plane - ideal for all ages/ skill levels
***Revolutionary 2 Player Option** using split screen display. This allows 2 players to each fly their own planes simultaneously in practice, dogfights or missions
*Full joystick, dual joysticks, mouse and keyboard control options
***Amazing "Black Box Flight Recorder"** included so that you can record your own flights and then save and replay them. 90 minutes of totally absorbing pre-recorded training flights are included with the game
*Internal/External views of your plane can be selected from front/ rear/left/right
*Powerful 30mm cannon capable of very rapid fire and long range destruction
*Easy to read instrument panel and simple controls
*3 very varied immense maps to explore - approximately 18000 km² in total
*20 fascinating and varied missions of increasing complexity are included with a promotion system from Cadet right through to Marshal of the RAF
*Superb range of targets/enemies including bombers, triplanes, fighters, tanks, control towers, anti-aircraft guns, HQs, patrol boats...

CHOCKS AWAY EXTRA MISSIONS

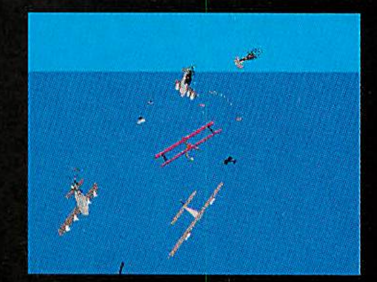
This consists of a new manual and a disc containing an additional 26 missions (6 of which are reconnaissance missions). It is loosely based on the original Chocks Away and features an extensive range of extra features and improvements. To run it you will require the MkII version of the original Chocks Away. Extra features include:

*16 new & detailed maps based over land & sea.
*20 enemy planes and 20 enemy targets are included in each mission. Over 1000 extra targets and planes have been carefully defined.
*Considerably improved action on all missions with plenty of targets to shoot at and plenty shooting at you.
*You can view the action from any of the enemy planes or targets and your own control tower at any time even while still controlling your own plane or watching a saved flight. There is a selection of tracking cameras (with adjustable zoom lenses!) around the playing arena. In addition a phantom plane can also be selected to follow the action on any of your black box flight recordings.
*Improved enemy pilots capable of performing loops, rolls, stall turns etc.. All enemy planes are carefully modelled using the same equations controlling your own plane. This ensures both an accurate and fair simulation.
*More enemy planes and targets to shoot including: Three Engine Fighters, Enormous Cargo Planes, Airships, Barrage Balloons, Gun Boats, Oil Tankers, Trains etc..
*Six reconnaissance missions where you are required to take photos of various installations with your new on board camera.
*Improved graphics over the 16 maps including Complex Cities, Houses, Railways, Roads, Rivers, Bridges, Lampposts, Railway Stations, Oil Rigs, Piers, Beachs, etc. to mention but a few. In total over 100 different graphics have been defined.
*Serial Port Link Up option so that you can link up 2 BBC A3000 or Archimedes computers and 2 pilots can fly simultaneously in full screen mode.
*Extensive enemy flak guns and improved enemy plane guns help make the new missions both more interesting and challenging to say the least!
*Improved digitised sound effects plus, of course, all the extensive options which are available with the original Chocks Away.

WIN a Superb......
"Radio-Controlled Biplane"
Successful completion of all 6 Reconnaissance Missions will allow you to enter this competition
TALLY HO GINGER!









ARCHIMEDES
& BBC A3000
All versions are compatible with the BBC A3000 and ALL Archimedes Computers

CHOCKS AWAY (Mark II Version with 1 or {split screen} 2 player options) £24.95
CHOCKS AWAY EXTRA MISSIONS (With 2 player Serial link option) £19.95
CHOCKS AWAY COMPENDIUM (Chocks Away & the Extra Missions) £39.95
CHOCKS AWAY NETWORK (Econet/Midi etc. - Ring for Availability & Price)

Chocks Away Reviews

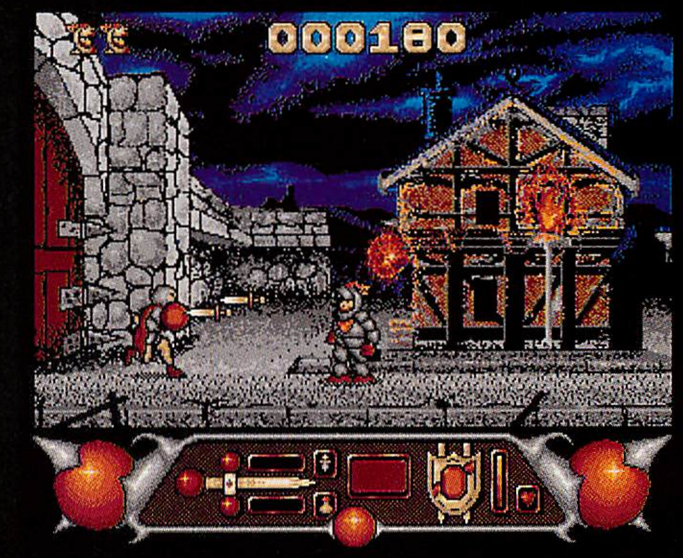
Chocks Away Mark I Version was awarded GAME OF THE YEAR 1990 by Acorn User, A&B Computing (now Archimedes World), Risc User & Micronet.
"Graphics in the game are superb, smooth and with plenty of ground detail.......this is a really enthralling flight simulator with plenty of variation and features to ensure longevity." Risc User, Dec '90.
"Chocks Away is a delightful game." Archive, Jan '91.
"Chocks Away is a brilliant game." BBC Acorn User, Dec '90.
"....it's a really great game. Playability 10. Value 10." The Micro User, Jan '91.
"(Chocks Away Mark II Version).. The increased speed obviously makes the game more responsive and fun to play, well and truly overtaking Interdictor II as the best Archimedes plane game." New Computer Express, Feb '91.

Extra Missions Reviews

"I reckon Chocks Away is probably still the best game available for the Archimedes/A3000." BBC Acorn User, August '91.
"How do you improve on a game that left me rushing for my Thesaurus to describe it? Well, those guys at 4th Dimension have delivered the goods once again, and have somehow managed to improve on the best flight simulation on our humble Arc." Club A3000, Summer '91.
"Chocks Away remains, above all, fun. It doesn't really sacrifice realism, but it also doesn't make controlling the aircraft so complicated that you haven't got time to enjoy the game.." Syracuse, Summer '91.
"If you haven't yet seen this game, the screenshots in the 4th Dimension's latest adverts don't do the game justice, simply rush out and buy it. Beware though, once you've played it once, you'll never have another early night." Micronet, June '91.

Enter The Realm





"A Superfast Adventure into Arcade Action"



Combining fast arcade quality action and graphics with the element of adventure and surprise. Meet strange characters, build up your weapons and eventually meet evil in mortal combat.

The Background

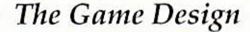
Travel back to Karidor, a land lost in antiquity. A land of evil, a land of good. A land where almost anything can happen and probably will. A land of magic and a land of beauty. So your quest begins.....

The land of Karidor was a quiet world much like Earth. It had mountains, it had seas. It had forests and it had deserts. Even the people were similar, but one thing was different. This was the fact that magic did exist there.

For many aeons the land was untroubled by any great power until one fateful day where everything changed and evil took control. Evil had always existed of course, but had been in balance with the good of the gods, who were neutral. That day however, the balance was tipped.

It turned out that the ancient prophecies of Karidor had proclaimed this event thousands of years ago. The prophecy stated that evil would overthrow the Realm and only one man, a knight of goodly heart and fearsome ability could reset the balance again. The knight was named Kharas.

Enter the Realm challenges you to lead Kharas in his conquest against evil. On the way, dangers will befall you and surprises will await you...



The Game Design

Enter the Realm is the first game to feature true parallax scrolling on the Archimedes and A3000 computers. The whole play area is created from layers which slide over each other creating a true 3 dimensional backdrop upon which the game proceeds.

The game features fast spectacular graphics which are all hand drawn and realistic digitised sound effects and speech which are totally interactive with the action all around you. Everything else in the game will be left as a suprise!

Specifications

Over 2 megs of high quality realistic graphics, all hand drawn.
Over 130k of in-game digitised sound effects and speech.
Over 150k of music by Peter Gillet.
50 frames per second arcade quality scrolling, animation and movement.
6 layer FULL parallax scrolling of play area (forget immitations!).
Massive sprites.
Realistic weather effects and intelligent adversaries.
Control via keyboard or RTFM joystick.





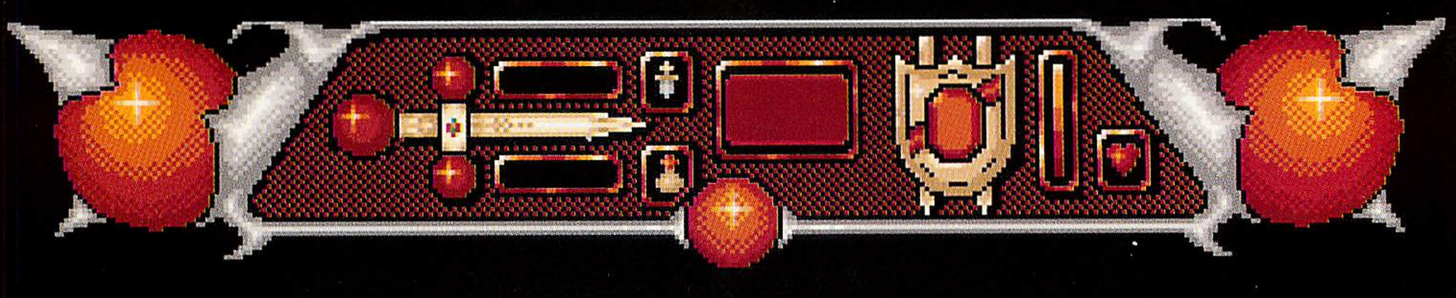




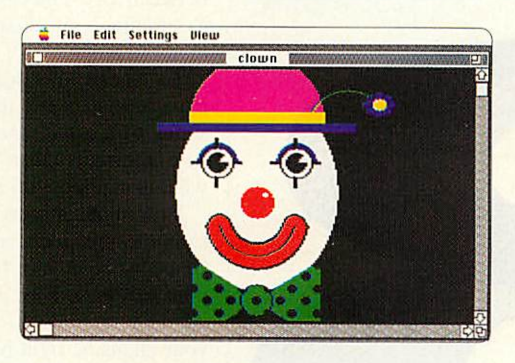


BBC A3000 & ARCHIMEDES PRICE £24.95

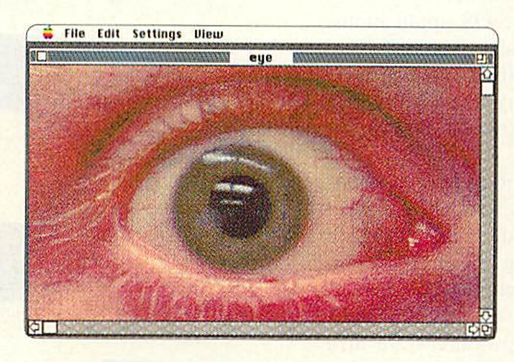
Enter The Realm is compatible with the BBC A3000 and ALL Archimedes computers



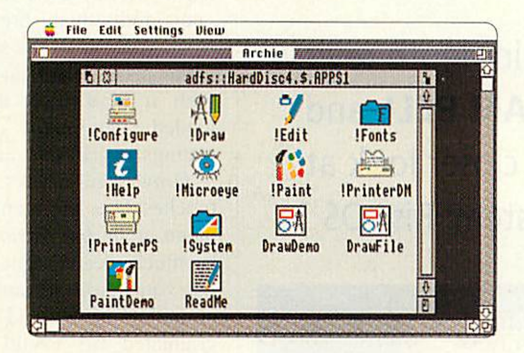
Announcing colour graphics conversion between the Acorn Archimedes and the Apple Macintosh



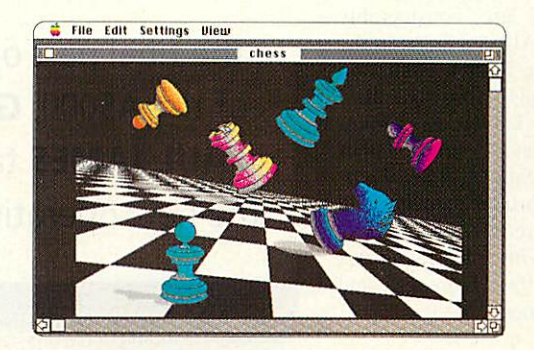
BBC Micro, Master 128, or Master Compact
Convert to or from a BBC Screen Dump in any appropriate mode, including Teletext. You can dynamically adjust the colours assigned to each logical colour in the original dump, to take account of different palette settings.



Macintosh
Convert to or from PICT, Colour PICT, or MacPaint format. Images can be manipulated in drawing and painting programs, or placed in other Macintosh applications, such as PageMaker, for subsequent colour printing.



Acorn Archimedes
Convert to or from an Archimedes Sprite in any appropriate mode. If the file contains several sprites you can select the one you want from a list of their names.



Microsoft Windows 3.0 on the IBM PC
Also … convert to or from Windows 3.0 .BMP files with up to 256 colours – the standard format for saving Windows screens, or for creating pictures in Paintbrush on the PC.

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Position ______________________

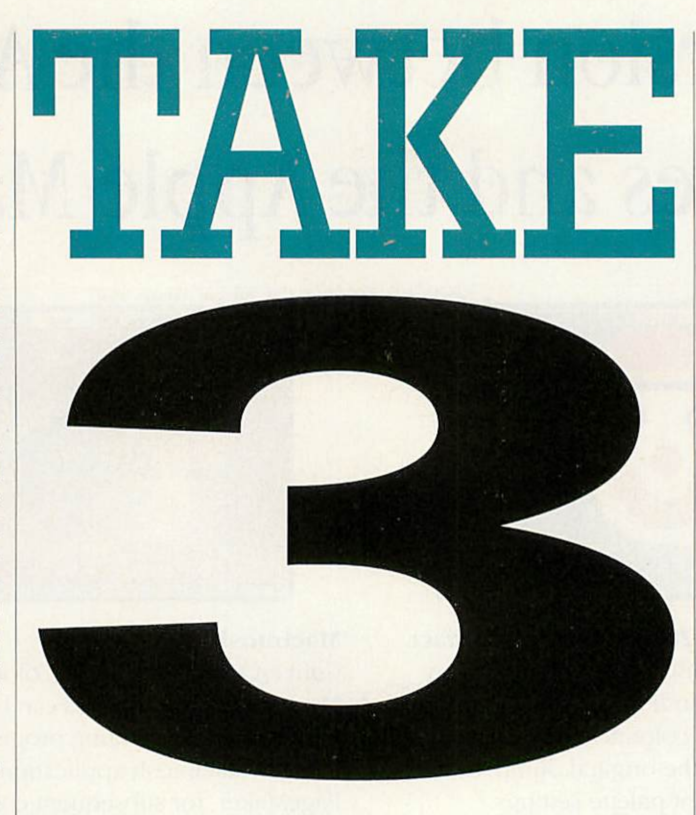
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Or telephone: (0223) 314934, or fax: (0223) 462562.



In the final part of our in-depth review of the A5000, GRAHAM BELL and PAUL JAMES take a closer look at the new operating system: Risc OS 3

Acorn's new A5000 computer is an interesting machine in its own right, but it is the inclusion of an updated operating system – Risc OS 3 – that has perhaps created most interest.

As well as providing an improved foundation for all existing Risc OS applications, Risc OS 3 also features many new or modified applications – these are sure to be of interest to both current and new Archimedes users.

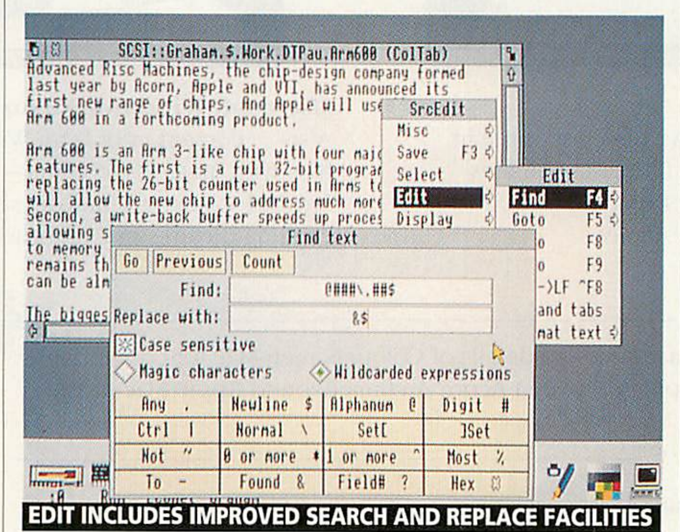
Like previous Acorn operating systems, Risc OS 3 is held in Rom. And, as the Roms are much larger than those in previous Archimedes – 2Mb in total – many of the main applications and resources are also held in Rom, which means that they do not need to be loaded from disc, and do not take up much Ram space.

All of the familiar 'core' applications are included in the Rom – in particular *Draw*, *Paint*, *Edit*, *Config* and *Alarm* – and all are considerably enhanced. Also included in the Rom are the Trinity, Homerton and Corpus font families (otherwise known as Times, Helvetica and Courier). Other new applications, like *FontPrint*, the printer manager and *T1toFont* are provided on disc, together with old favourites such as the *Patience* and *Lander* games.

DRAW

Draw is the application that is most obviously improved. *Draw* is an object-based drawing package – pictures can be built up from straight lines and curves in a variety of styles, from other shapes (like rectangles), and from text in a variety of typefaces. Each object in the drawing can be edited individually, coloured, moved, resized and so on, to build up the required effect.

Always the most approachable of the main applications, *Draw* is now more impressive because it benefits from the new outline font manager (also in Rom). This means that text objects can be rotated to any angle in the same way as other objects – by dragging their 'handles'. Rotated text can have all of the attributes of normal text: colour, typeface, size and so on, can all be changed. All text objects are now editable, even when rotated, so a spelling mistake no longer means retyping the whole line of text. And, although there is now much less need to change text into outlines, there is a menu option to do just that. You no longer need a separate utility, such as *FontDraw*. In the same way, sprites can now be rotated just like normal objects and text. This means that you don't have to use *Paint* separately to rotate sprites before you import them into *Draw*.



EDIT INCLUDES IMPROVED SEARCH AND REPLACE FACILITIES

Another pair of impressive effects are the interpolate and grade features. Here, two similar objects can be grouped. Grade produces a series of extra objects between the first two, but with their colours graduated from one to the other. So grading from a big black circle to a small white one would create the effect of a circle grading smoothly from black through grey to white in the centre. Interpolation between two objects produces a 'grading' of shape, rather than of colour.

To speed up drawing for experienced users, there are a series of Control and function key shortcuts that duplicate what is available on the menus – F4 groups objects, F1 controls the grid lock, and so on. Also, a complete history of your actions is kept, so there is the option to undo and redo your changes, right back to the very beginning of the drawing. The undo buffer size is controlled from the desktop Boot file. Other user-defined defaults can also be included in this boot file, such as paper size, grid lock and zoom. This allows *Draw* to be tailored to your individual preferences. Also, when a file is saved, all *Draw* settings are saved along with it, and each draw file loaded can have different settings of grid size, and so on.

Draw still lacks a few touches – a hierarchical font menu *à la Impression* would be much clearer than the long list you get. And auto-tracing around sprites and a real graduated fill would still be worthwhile additions.

Another that would be particularly useful in *Draw*, as well as other Risc OS applications, would be the auto-scrolling of long menus – for example, font menus – but this has not been implemented. But nonetheless, *Draw* now incorporates many of the features on most users' wish-lists.

EDIT

Like *Draw*, *Edit* now benefits from the built-in outline font manager and font families, and a series of function key commands to make editing easier. Where possible, the shortcuts are standardised, so F3 saves a file in both *Draw* and *Edit*. Both use an unlimited number of fonts – the Risc OS 2 versions could not deal with more than a handful of type families.

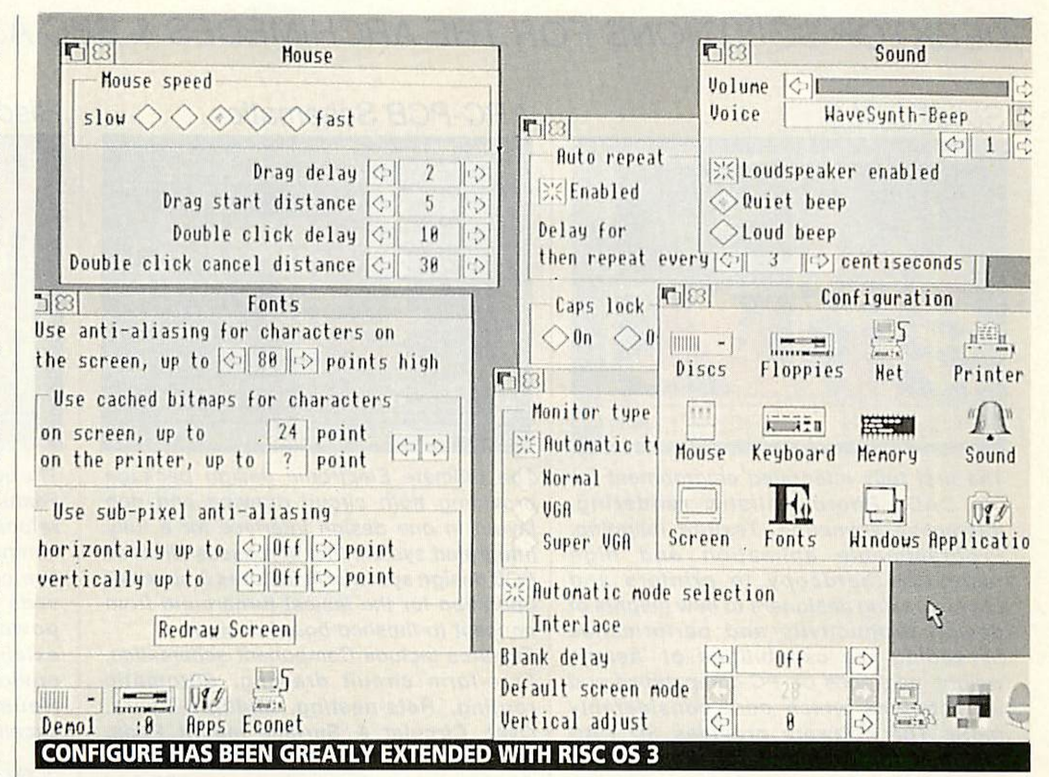
Although *Edit* remains a 'text editor' and not a word-processor, its ' text processing'

features have been improved. It is now possible to wordwrap text automatically as you type, so when you reach a preset formatting width, the next whole word will go down on to the next line – you don't have to press Return each time. You still set the width with the old Format text option, and there is still no way to reformat the whole text to a new width – you have to do one paragraph at a time.

To improve things further, you can overwrite text as well as insert, and the Tab key can be made to tab in columns. The width of each column is set at eight characters.

The search and replace facilities are better too. The 'magic characters' system has been supplemented by a wildcard system that is more in line with the Master 128 *Edit*. These wildcards can be very powerful when used correctly. For example, all non-printable characters can be replaced by searching for characters that are not between ASCII values of space and backslash, and replacing them with nothing. This is represented by ~[-\~$] – the ~$ means not carriage returns, so they are ignored. A word count can be achieved by searching for strings containing mostly alphanumeric characters, such as, %@, and then clicking Count.

Finally, *Edit* can now edit Basic programs: in effect, many of the facilities of the widely-known *BasTxt* converter are now built-in, and Basic programs can be loaded into *Edit* by dragging or Shift-double clicking. In fact, Shift-double clicking on any file – whether a drawing, sprite, spreadsheet or whatever – will load it into *Edit*. A useful feature is that line numbering can be completely transparent, and you can resave your edited program over the original Basic one. Then, double clicking on it will run it as usual, with the modifications.



CONFIGURE HAS BEEN GREATLY EXTENDED WITH RISC OS 3

PAINT

The third of the core applications – the sprite editor, *Paint* – has, it seems, changed the least. It unfortunately retains some serious bugs, particularly with the now much faster sprite rotation option. However, creating sprites may now be a little less intimidating to new users: clicking on the *Paint* icon immediately creates a blank sprite rather than simply opening a window within which you have to use the Create menu option. Again, this can be controlled from the desktop Boot file using system variables, as can the option for opening Toolbox and Palette automatically when editing a sprite.

Three new menu options allow you to further modify a sprite, by reducing, magnifying, stretching it vertically or horizontally, or shearing it left to right. A few inconsistencies have been ironed out. The transparent colour used to create sprite masks can now be used in fill operations just like any other colour. Transparent will replace any other colour, and can itself be replaced, either locally or across the whole sprite.

The brush option (which is useless until you click on Shape) now has square and triangular brushes built in, along with the old eliptical brush. And the Grab Screen area option – which was unable to grab a picture including a menu – now incorporates a delay, giving you time to compose exactly the screen you want, before the 'snapshot' is taken. But there is still no 'hot key' grabbing.

Acorn has not taken the opportunity to broaden *Paint* at all. It is not a painting package in the sense of *Revelation* or *Artisan*, and there is still no support for importing non-sprite images, or for TIFF files, in Risc OS 3.

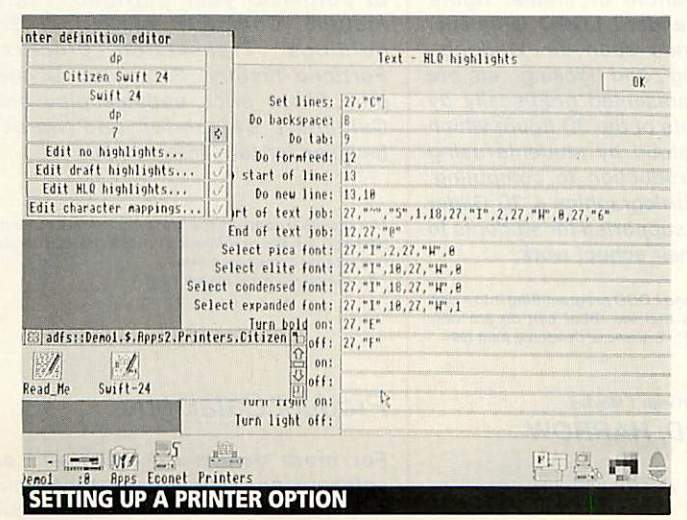
CONFIGURE

One process that has undergone major changes is that of configuring the machine. The Configure application is stored in Rom, and clicking on it after it has been loaded produces a filer style window, where each of the icons represents a group of possible configurations.

What would have been a double click, but is in fact a single click on one of these icons, pops up a dialogue box with the individual options in it. For example, clicking on the sound icon brings up a dialogue box with the volume slider and the option to change sound voices.

Extended mouse configurations not only let you alter the speed of the mouse, but also how fast or slow you have to double click to register a double click, and how far you are allowed to move the mouse away from the first click – ideal for first-time users inexperienced with the mouse.

You can also alter how far the pointer moves and how long you have to hold down a button before a drag starts.



SETTING UP A PRINTER OPTION

SILICON VISION

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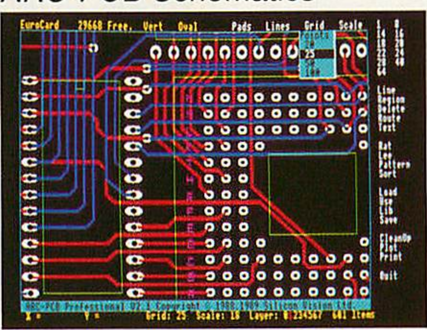
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"Puts Silicon Vision at the top of the CAD market"
- A&B Computing November 1990.

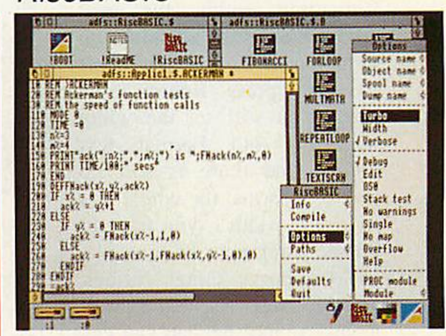
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RiscBASIC



The best BASIC V compiler money can buy. Features include an optimising compiler, relocatable modules with multiple star commands, Window-based or command line compilation environment, standalone code generation, in-line assembler with powerful floating point mnemonic extensions and a Desktop developers environment from a leading Software House renowned for technical excellence.

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- RISC USER August 1989.

"very useful indeed for development work...produced significantly more efficient code" - Micro User July 1989.

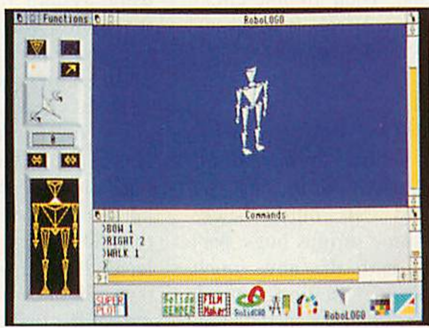
SolidsRENDER



The most advanced Ray Tracing package for the Archimedes producing photo-realistic images of designs taking into account multiple colour light sources, reflections, shadows, transparencies, refractions and textures for the highest quality pictures from the leading 3D graphics experts renowned for technical excellence. The high-speed ray tracer provides anti-aliasing for smooth edges, motion blur effects, and variable camera lens for wide angle and telephoto effects.

"SolidsRENDER offers the most comprehensive and advanced object properties ... the fastest ray-tracer ... outputting the highest quality images"
- A&B Computing November 1990.

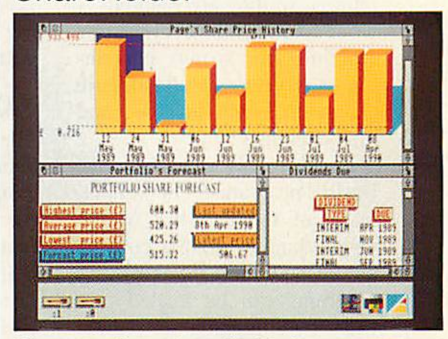
RoboLOGO



This new extension to traditional LOGO, provides three dimensional control of an articulated humanoid or animal figure based on the standard LOGO language. Natural commands such as 'Walking', 'Turning', 'Bowing', and 'Picking', etc are automatically represented graphically by natural movements of the 3D figure which is readily understood by students using LOGO as an introduction to computing. The traditional Turtlegraphics & 3D Glider features are also supported for students to further explore their school work.

"Takes turtlegraphics and LOGO programming into a new dimension. The things that the robot can do are only limited by imagination!" - Educational Computing April 1991.

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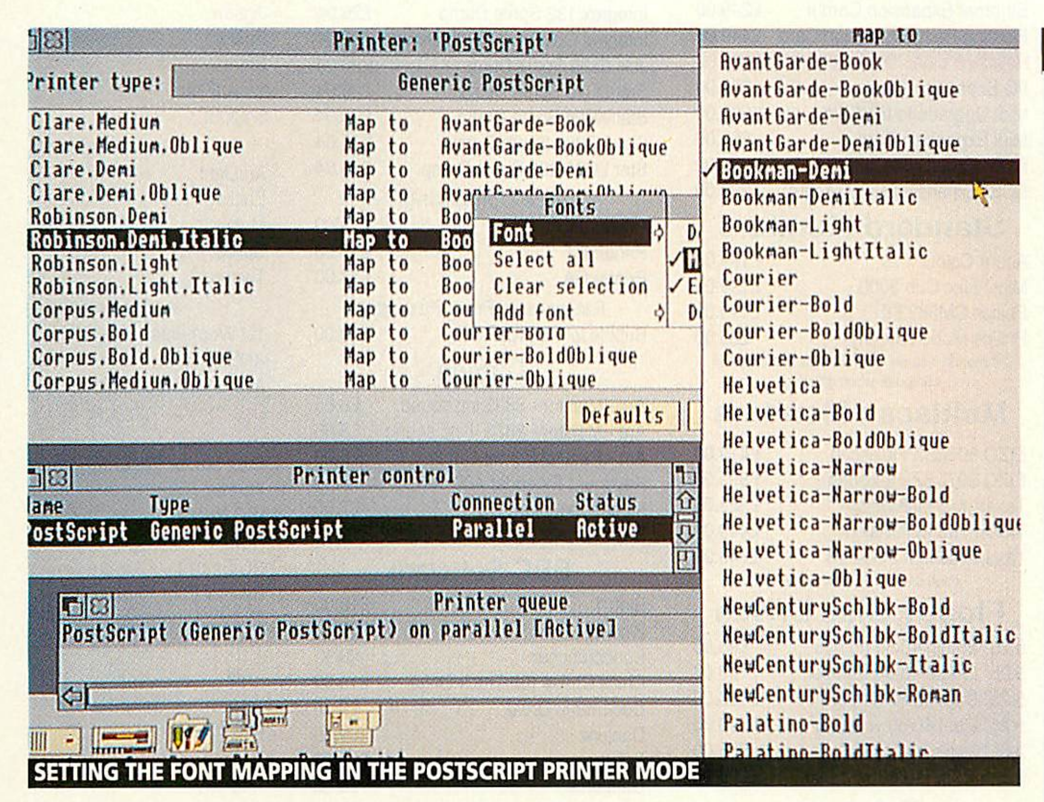
"An excellent concept, the first professional share related package for the archimedes ... well thought through ... remarkably comprehensive."
- Archimedes World March 1991.

All RISC OS software run in native mode on all Archimedes Computers & BBC A3000 with 1 Mbytes.

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SETTING THE FONT MAPPING IN THE POSTSCRIPT PRINTER MODE

Small changes like this can make a surprising difference to the 'feel' of the desktop. There is, however, no 'ballistic' option that some of the PC mice can provide.

In the screen configuration dialogue box, a blanking delay can be specified (the time before the screen blanks during periods of inactivity) and the start-up screen mode, although the A5000 will usually make this decision. All configuration options now take effect as soon as the dialogue box is closed – for example, you can remove hard drives on the icon bar on the fly, albeit with a warning first.

Finally, each one or all of the Rom applications can be configured to load on start-up, so your machine can start-up with *Edit* loaded, for example.

ALARM

Risc OS 2's Alarm application is simple. It puts a clock on the icon bar and allows you to set screen reminders of future events. The new version is superficially the same, although the alarms can be set to repeat in a more sophisticated way. It is possible to have alarms sounding only on certain days, or even just on weekdays. You can even set it to go off every second Tuesday of the month if you want. But the best thing is that it can easily be set to run any file instead of giving a screen reminder. You just drag the file into the Set Alarm dialogue. Firing up a particular application every day at 11pm might not be all that impressive, although running a sampled sound file could be, perhaps to give you a verbal reminder of something.

What tasks do you do every day? Collect electronic mail? Back up your network? Both of these are already possible. As more applications incorporate scripting, or some element of 'programmability', then this feature will become more powerful and useful.

APPLICATION DISCS

Acorn's Font manager uses its own system of outline fonts. These are not compatible with the Type 1 Postscript fonts that are used throughout much of the professional publishing industry. Two Risc OS 3 applications on disc are intended to bridge the gap.

The simplest is FontPrint, which allows Acorn-format fonts to be converted into Postscript form and either saved or sent to a Postscript printer. The printer stores them, and then the font can be used to print any Acorn document thereafter.

So the many non-Postscript compatible fonts in the EFF or Longman Logotron catalogues can now be printed on Postscript printers or typesetting machines. T1toFont goes the other way: Postscript fonts can be bought on Mac or IBM discs for about £50 per face. This is expensive in Acorn terms, but there is a huge range of high-quality fonts available which can now be converted into Acorn format and used on the Archimedes. However, the conversion is not perfect, and hinting in the Postscript font cannot always be translated into Acorn 'scaffolding'. The on-screen representation of converted faces may be a little ropey. Nevertheless, T1toFont will prove a boon for professional Archimedes users.

Other simple utilities on the Applications discs include: *Squash*, a small utility that will toggle the state of a file between compressed and uncompressed; *SciCal*, which is a more advanced calculator; *Maestro*, which has not changed, and *Magnifier*, which now loads on to the icon bar.

New users may find that after playing *Lander*, the fast machine becomes a little sluggish. Don't worry – this is only because *Lander* turns off the Arm3's cache and does not bother turning it back on again. This can be cured with a CACHE ON command.

PRINTERS

If there was one thing that might have confused users of Risc OS 2 it was – and still is – the printer drivers. Printers are strange beasts – they are mostly standardised, offering Epson compatibility, but some models break out of this mould, and offer extra features.

They are, in fact, very simple, but if you have a printer that does not conform, then having to edit the PRData files can be a somewhat testing experience.

The Risc OS 3 printing software bears little resemblance to its predecessor. In fact, there is only one printer manager, on to which is dropped a printer configuration. There are many predefined configurations, which are all well researched and very detailed, even down to special character sets and little idiosyncrasies of certain printers.

It is now possible to have several different printers on the icon bar at once, and the active one that receives data is highlighted by clicking on it – the others are greyed out. This might be used if you had a network Postscript printer and a dot-matrix connected to the parallel port of your machine.

If it is necessary to alter one of the supplied printer description files, then PrintEdit provides a far friendlier front end than manually adjusting the descriptions with Edit.

Double clicking on a printer definition file will load it into PrintEdit. This allows you to alter highlight codes in three possible printer modes – plain, draft and NLQ (near letter quality), because they often vary between modes. Character mapping is also implemented – this means that, for characters above 128 (which can be entered using Alt and the keypad), a string of printer commands can be obeyed instead. For example, character 150 could switch the printer to IBM emulation mode, print a vertical bar, then return to default mode.

Adding a new graphics mode is as simple as entering the resolution. Clicking on this new resolution pops up a window, in which you tell the driver what codes to use to select the mode, perform a line feed, and so on.

So the new printer driver system offers the ultimate in 'tweakability' for printers not covered by the defined drivers.

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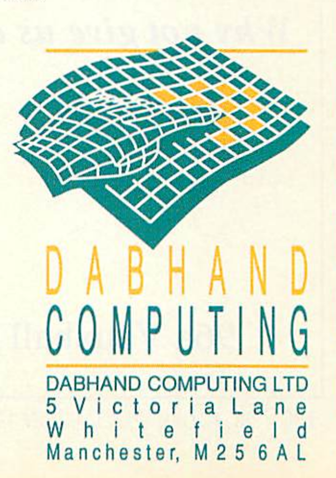


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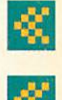
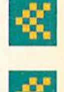


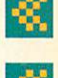




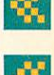













The smArt Suite

All 4Mation packages for the Archimedes carry a FREE SITE LICENCE.

SmArt is a Linked Graphics System. When picture files are loaded into smArt, different parts of the picture can be changed by making selections from a menu. The graphics components are automatically scaled so that the parts always fit. Pictures may be saved as Draw files or transferred to DTP programs or any other applications which can handle Draw files.

The smArt package comes with over two dozen files on subjects ranging from shops to cars, and churches to British Isles maps. Available as separate products are discs of smArt files on specific themes such as Leisure, Heraldry, Faces, Fashion, Homes, Trees & Gardens, and Dinosaurs.

smArt £55 (NZ$ 198) smArt discs £16 (NZ$ 59)



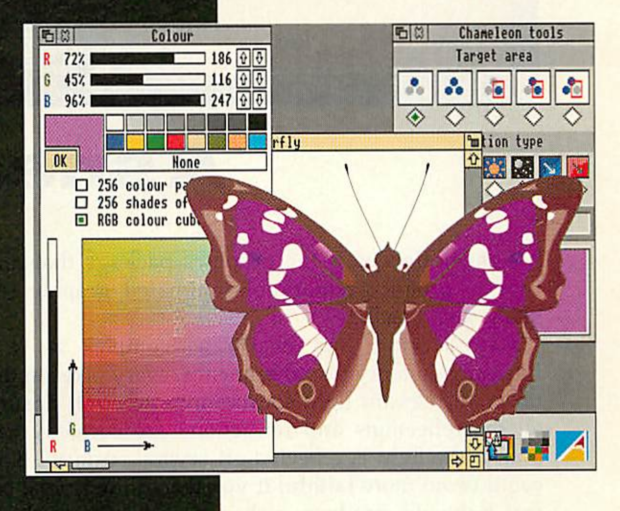
For those wishing to create their own smArt files, smArtFiler is an application which compiles smArt files from your source Draw files. Full instructions are provided along with lots of examples. Individual components may be scaled, rotated, and placed in front of or behind other components. Menu entries may be specified.

If it can be drawn it can be a smArt file.

smArtFiler £35 (NZ$ 129)

Chameleon is an ideal companion to smArt, and a must for anyone who needs to make quick and easy colour changes to Draw files. As well as palettes for 16 and 256 colour modes, there are options for 256 shades of grey and a RGB colour cube which provides thousands of colours. Colours may be selected from other Draw files so can be copied from one picture to another. Colours may also be changed in HSV values; Hue, Saturation and Value. Edited files may be saved as normal Draw files or as colour separations. A clever Undo and Redo facility allows virtually any number of colour changes to be cancelled and then reinstated. Zoom and Magnification facilities allow accurate editing of small areas.

Chameleon £25 (NZ$ 95)



FREE DEMO DISC

Send us a blank disc to receive a demo copy of smArt and Chameleon. Only the save facility is missing. Poster demo also available.

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Snippet	£29	NZ$120.00
Jigsaw	£29	NZ$120.00
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DTP Seeds*	£ 8.45	NZ$ 35.00

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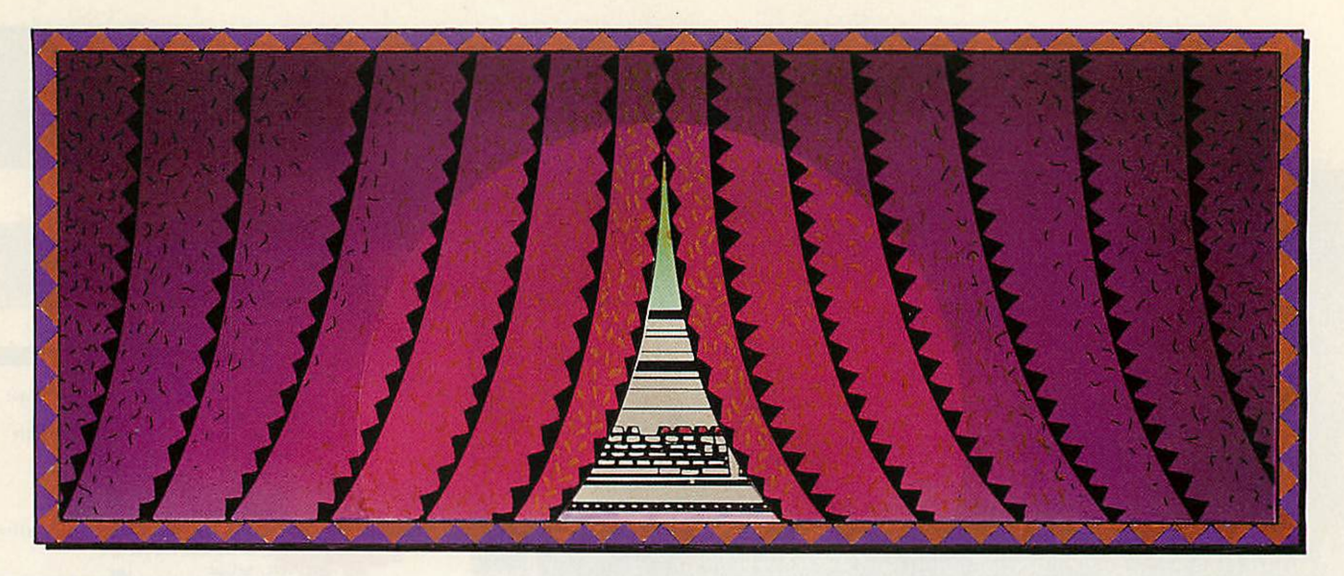
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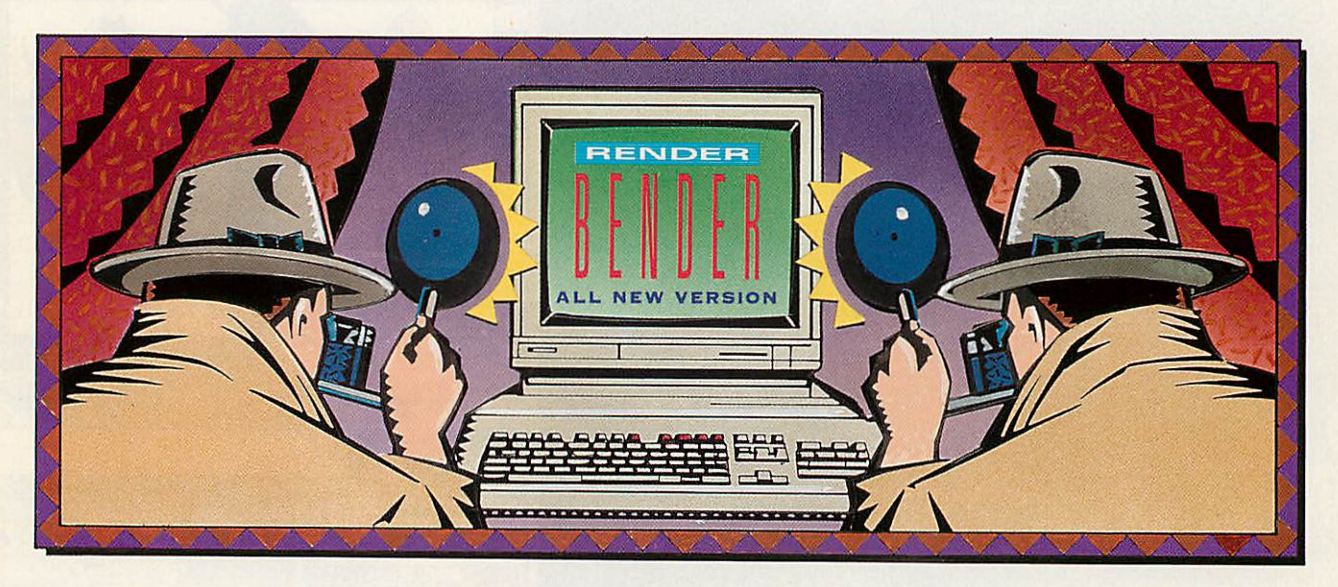
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What does everyone who creates moving pictures want?



A sneak preview.

Render Bender is the graphics package that allows the user to produce remarkable animated graphic sequences using Ray Tracing.

Ray Tracing isn't nearly as complex as it sounds. Basically, in a ray traced sequence, every pixel on the screen takes all relevant light sources into account. Ensuring that all the reflections and refractions are correctly calculated even if the light is reflected off several surfaces. The image could be no more faithful if you were filming real objects in real light. To produce such a superb animated sequence, however, was quite a difficult task – Until now.

Illuminator has changed all that. It is a fully RISC OS graphical front end to Render Bender. Allowing the user to create a series of frames manually, or to give it a start point and an end point, leaving it to generate the frames in between. What you are getting is the ability to take a sneak preview. You can see what you are going to get, before you get it. After you've created your outline frames in Illuminator, you then transfer the files to Render Bender, the fully RISC OS Ray Tracing part of the package. Which all means that now, to achieve powerful 3D Animation, you no longer have to be a mathematical genius. You just have to be the proud owner of Render Bender 2.



For more information please write to the address below for a Render Bender fact pack. We're sure you'll find it quite illuminating.

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GOOD AS NEW

A secondhand BBC micro could help to boost your computer power. **CHRIS DRAGE** advises on the current state of the market

Thanks to the growing number of Archimedes and A3000 owners around, there has never been a better time to buy a second-hand BBC micro.

It's not really surprising that many new or prospective 32-bit owners are choosing to sell their eight-bit BBC B or Master computers, to help finance the new purchase. But why would anyone want to buy a secondhand BBC micro, the first version of which was launched 10 years ago?

The answer is the same now as it was then: because it's a really useful machine, reliable well beyond Acorn's original estimate of a five year life span. I am still using my school's original Beeb in the classroom. Purchased 10 years ago, it has been repaired only once, despite constant use.

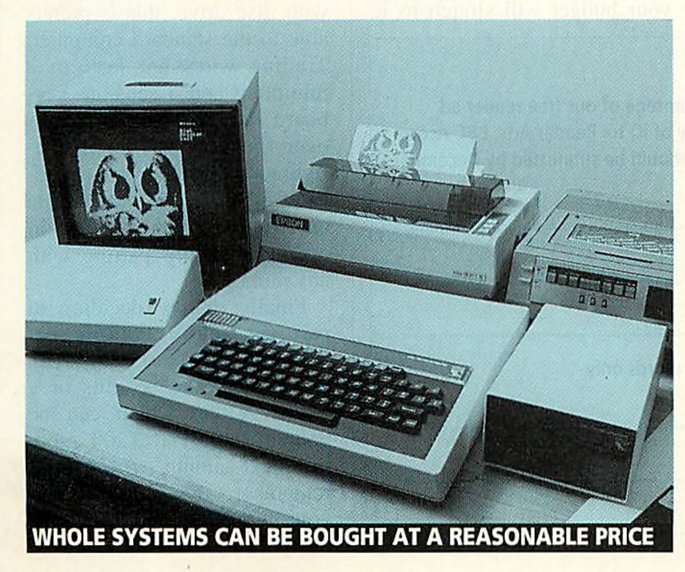
Furthermore, the old model B is a highly versatile machine which can be used with almost any monitor and dot-matrix printer. It expands well beyond its original specification, with add-ons from a multitude of third party suppliers, and possesses all the ports you could need. You have to pay extra for these on the A3000. In short, the machine has a capability that was unheard of when it was first released. But the real question is – what can it do today?

IN CLASS

Educational users are likely to be keen to pick up a secondhand Beeb. As well as working within limited budgets, many establishments have already invested in BBC B software. Add to that the need to put at least one computer in each classroom, and the model B becomes an even more attractive choice. Similarly, the importance of IT in pre-school education has led many people to search for older machines which fit in with their budgets. A lot of software around is ideally suited to this level.

A model B or Master 128, coupled with an external hard disc and modem, will make an ideal low-cost bulletin board. The same is true of specialist applications involving control, monitoring and data logging. Secondary schools can use model Bs for things such as monitoring the weather. The Master 128 is the ultimate BBC micro with all of the features users said they would have liked in the model B, but without the extra cost.


THE BBC MICRO – GOOD SECONDHAND VALUE


WHOLE SYSTEMS CAN BE BOUGHT AT A REASONABLE PRICE

It has many attributes over the unexpanded B, including additional usable memory, and so represents a better buy if you want to do memory-intensive work, such as wordprocessing or running spreadsheets. If you want to run purely educational applications, however, there is little point paying for a Master 128 – all of the software is primarily designed for the B.

The Master Compact is similar to both the Master and B, but is also something of a hybrid, which was not particularly well supported by anyone when it was launched. This makes it a red herring when you are considering purchasing a secondhand micro.

However, the 3.5in disc format is compatible with the Archimedes. Therefore files written in *View*, for example, can be saved to floppy disc and loaded directly into an Archimedes Desktop publishing package such as *Impression*. Advantage can therefore be taken of the superior power of any Archimedes a school may own. Compacts are ideally suited to this type of dedicated operation.

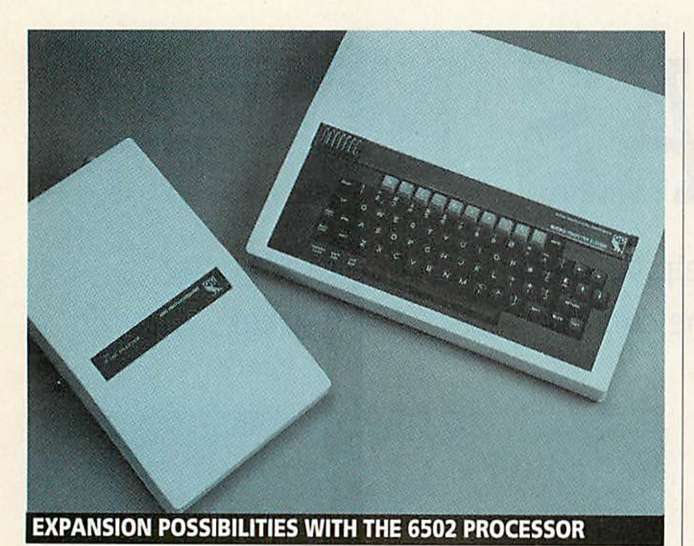
WHERE TO LOOK

But what about the secondhand market – where *are* these machines to be found? What features should you look for, are there any pitfalls and, most important, what price should you pay?

Well, in answer to the first question, many dealers sell secondhand machines which are either old display models or have been traded in. Also watch out for the advertisements in *BAU*. You will be pleased to hear that free reader ads will be making a reappearance in the next issue of the magazine – see the separate coupon on the following page.

As for typical prices, take a look at our price guide. It is remarkable how well the BBC micro has held its price over the years, while its contemporaries have plummeted in value. Recently an advertisement for a network of RM Nimbus machines was asking only £30 per machine.

Obviously such figures are



EXPANSION POSSIBILITIES WITH THE 6502 PROCESSOR

only a rough guide as, more often than not, people tend to dispose of complete systems in order to start afresh with more advanced computers. Last year, for example, my school was able to purchase an elderly BBC B plus mono monitor and 40 track disc drive for just £200.

There are several points to be aware of when considering buying a secondhand model. Firstly, aim to buy a complete system suited to your needs. You don't want to spend more money than you have to, and bringing a cheap secondhand system up to the required specification could end up quite expensive, defeating the whole object.

Buying a printer for a secondhand system is an investment for the future, but spending £200 on a colour monitor is another matter altogether. Unless it has both linear (TTL) and analogue (RGB) inputs, you may not be able to use it at a later date with an Archimedes. See your local dealer about a Philips model, designed for used with either system.

To a lesser extent this advice holds true for purchasing new disc drives for any BBC B system. Although an external drive can be later used with an Archimedes/A3000, an additional external disc interface must be fitted.

Always purchase a BBC B with an issue seven mother board. Issue four is only worthwhile if the computer is working and ridiculously cheap. It should also have Basic version 2 and an Acorn DFS version 1.2 fitted. There are many other disc filing systems around, but these cannot be guaranteed to work with all of the software you may wish to run. Many suppliers of double density disc interfaces, for example, no longer support their products.

Your prospective Beeb may be fitted with a Rom or Ram expansion board. In my view, two boards in particular enjoy an enviable reputation for reliability: the Aries B20/B12 Ram-Rom boards and the ATPL Sidewise Rom board.

Any computers fitted with these boards should be reliable and worth the asking price. But again, do be wary of additional add-ons advertised with the machine. A poor quality Rom board can cause the machine to crash constantly until it is removed.

Another reliable and popular Rom expansion system is the Viglen/Care Electronics Rom cartridge system which allows unlimited numbers of Roms to be added to the machine, albeit one at a time. As Roms are encased in sturdy cartridges, they can be slipped in and out quite safely. When it comes to fitted Roms, you have to decide which will best fit your requirements and are therefore worth the asking price. Among the plethora of utility Roms is *Advanced Disc Toolkit* from PRES Ltd, a program equally at home in a Master 128.

A few extras are always worth having: *View* and *Wordwise Plus* are the de facto wordprocessors for the Beeb; *Viewsheet* and *Intersheet* spreadsheets are widely used; and *Viewstore* is a popular database manager.

Model B+ 64K and B+ 128K computers can each be regarded as a half-way house between a BBC B and a Master 128. Their only real advantage over a B is the extra Ram available, useful for the data-intensive applications mentioned earlier. A Master 128 is a much better investment if your budget will stretch to it.

PRICE GUIDE

Below is a guide to the value of secondhand BBC micros. However, please note that prices may vary considerably, according to the age and condition of the equipment, and whether it is being sold privately or by a dealer:

The best deals can often be made privately, but a reputable dealer, on the other hand, may be more reliable.

- Basic BBC B without a disc interface - £110
- BBC B with a DFS and 40/80 disc drive - £220-£275, depending on what else is bundled with the machine in terms of hardware/software. This can range from Rom/Ram expansions to sideways Ram boards and additional disc drives
- BBC B with external hard disc drive - £350-£450
- Basic Master Compact system - £185-£200
- Basic Master 128 - £250-£270
- Master 128 with twin disc drives - £320-£360
- Master 128 with hard disc system and additional hardware/software - up to £600
- Master 512 with twin disc drives, ROMs in cartridges and other hardware or software - about £500
- BBC B + 64K - £150
- BBC B + 128K - £160

Its design incorporates all the best features of the BBC system: sideways Roms in cartridges, extra screen Ram, numeric keypad, and so on.

If you are lucky enough to be offered a system mounted in a Viglen Console, complete with disc drive, this is preferable to the standard computer. Trailing wires are kept to a minimum and a separate keyboard has distinct advantages over the normal (fixed) configuration. Whichever secondhand BBC micro you decide on, try to see the system in operation before parting with any money.

Finally, before deciding to part with up to £500 for a secondhand Master 128 system, do consider the benefits of a 32-bit A3000 which can be bought for about £200 more (see next month's *BAU*). And remember, the motto is, do your homework and buy cautiously. Happy hunting!

BAU FREE READER ADS COUPON

If you want to sell your secondhand computer equipment, why not take advantage of our free reader ad service? Simply fill in the details below and send this coupon (or a photocopy of it) to: Reader Ads, BBC Acorn User, Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ. Coupons should be submitted by December 31 1991 to be included in the March 92 issue (published February 12)

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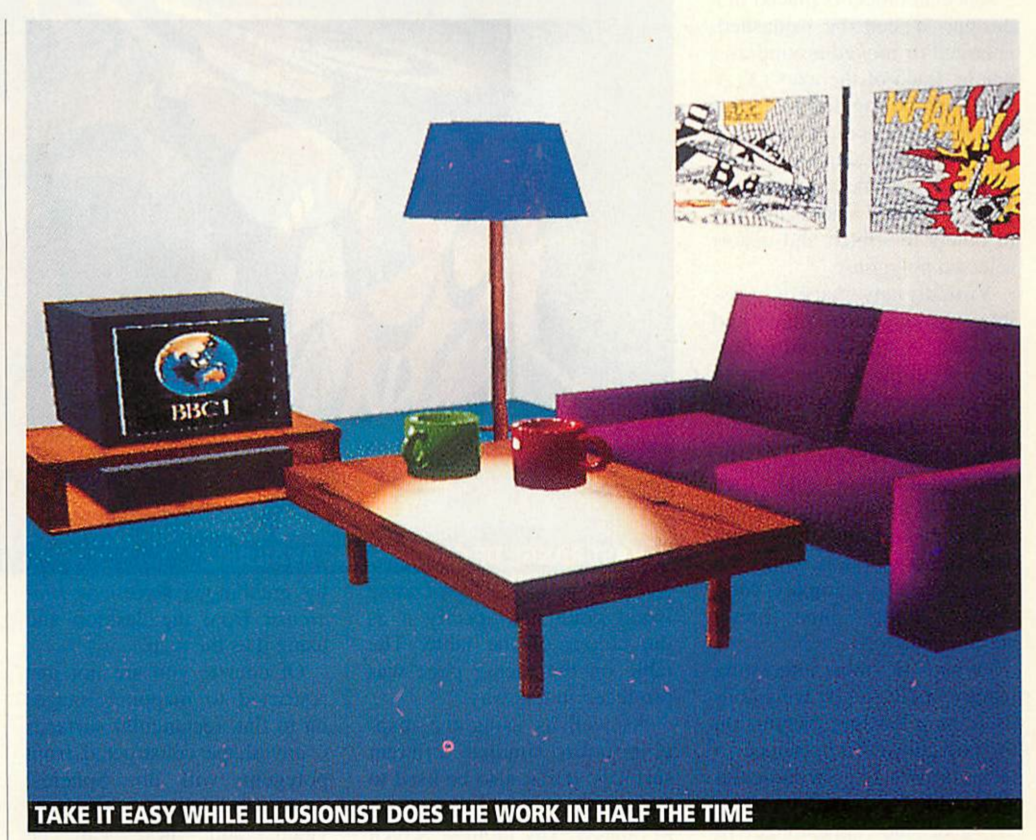
SEEING IS BELIEVING

As computer graphics become more popular **ROB MILLER** puts his faith in Illusionist

Computer graphics cover a broad spectrum of topics from simple painting programs to complex ray tracing. The results of ray tracing can be stunning but time-consuming, with the computer taking up to six hours to process an image. In contrast, the images shown on these pages took only one hour to be rendered.

Why? Because they were produced using a program that creates almost photographic results in a short space of time. This is achieved by ignoring the reflections and shadows and plotting objects as a series of polygons. Various algorithms can be inserted in the program, allowing curved surfaces to appear smooth rather than faceted. Light sources can also be simulated to highlight objects and give them a sense of depth.

Illusionist from Clares is the program in question. It allows the Archimedes user to produce realistic scenes and objects in a relatively short space of time. As you can see, the results are remarkable.



TAKE IT EASY WHILE ILLUSIONIST DOES THE WORK IN HALF THE TIME

GETTING STARTED

Illusionist comes on two discs; one storing the actual program, the other containing some example files and pictures. Both discs can be transferred to a hard disc. To load the program, simply click on the *Illusionist* icon and it will install itself on the desktop icon bar.

It is entirely mouse-controlled, with just the occasional parameter or filename to be typed in. As it complies fully with Risc OS standards, anyone familiar with the desktop environment should find it easy to get started.

At this point, as always when using a program for the first time, there is the temptation to dive straight in and try things out. In this case however, I would recommend a different approach – read the manual first and then play. It's not that *Illusionist* is particularly complicated, but it does use different techniques when compared to other 3D editors.

The main *Illusionist* window displays four views – side, front and plan elevations, plus a 3D projection. It also shows a set of icons for the most useful tools. The area used for each view cannot be changed, although the scenes within them can be scaled up or down or panned in any one of eight directions (up, down, left, right and diagonally).

This approach, with everything on-screen at once, eliminates the need to constantly switch views and certainly speeds up the design process. One drawback is that the overall *Illusionist* window is of a fixed size, so that users with multiscan monitors and resolution enhancers (such as Atomwide's VIDC Enhancer) can't make use of their increased resolution.

OBJECT D'ART

Like other 3D editors, scenes can be built up of single polygons, or pre-built shapes such as cubes, spheres and toruses (a doughnut shape).

A polygon can have any number of sides, and be irregular to the point of having sides that bend inwards as well as out (such as a bow-tie shape). To plot a polygon is simply a case of marking the points in the relevant view window. Pre-built shapes are easily placed by specifying their position with a special cursor. For accuracy, switch on the grid which can be anything from one unit upwards.

A special Sweep tool allows users to specify a side profile outline which can then be rotated to form a solid object, such as a goblet. Two parameters control the end result; one being the number of steps taken to complete a rotation, and the other being the number of degrees to rotate through.

If small steps are used the object will have a more rounded look, although this takes considerably longer than large steps. Use the Smooth option on sweeps to disguise the squared look of an object created using a large step.

Sweeps can also be rotated through more than 360 degrees to form spiral shapes. Each time the profile is rotated through 360 degrees, it is offset one unit from its original

vertical position. All sorts of coiled shapes can be produced using this method.

A special marking system can be used to label each polygon (or group of polygons) as you create them. For example, you may create a cube and add four cylinders to make a table. The completed image can then be named Table and re-loaded at any time by selecting its name from a list.

Once an object is placed in a design, it can be squashed, enlarged or moved around as a whole. Each of the axes (X, Y or Z) can be toggled on or off to enable selective distortion of shapes. Individual or groups of points can be selected and moved around independently of others to stretch and distort selected polygons.

Virtually any shape is possible, given both time and patience. A special tool is provided to allow any polygon to be extrapolated, in order to create a solid object.

Separate objects can be grouped together and then merged to form a single image which can in turn be distorted. The Smooth option works on even the most complex solid shape, giving some pretty weird results.

Perhaps the most interesting feature of *Illusionist* is its ability to map existing pictures on to polygons. To produce a table, draw a large rectangular slab, with four tubes for legs. To give the appearance of wood take a picture (either Mode 12 or Mode 13) of some wood grain and specify it as the colour of the table. The table on the facing page was produced in this way.


A VAST RANGE OF COLOURS ARE AVAILABLE

As well as using the mapping tool to simulate different surfaces, it can also be used to project pictures and designs on to objects. The monitor screen on the next page was created by grabbing a screen of *Illusionist* from the desktop and using it as the map.

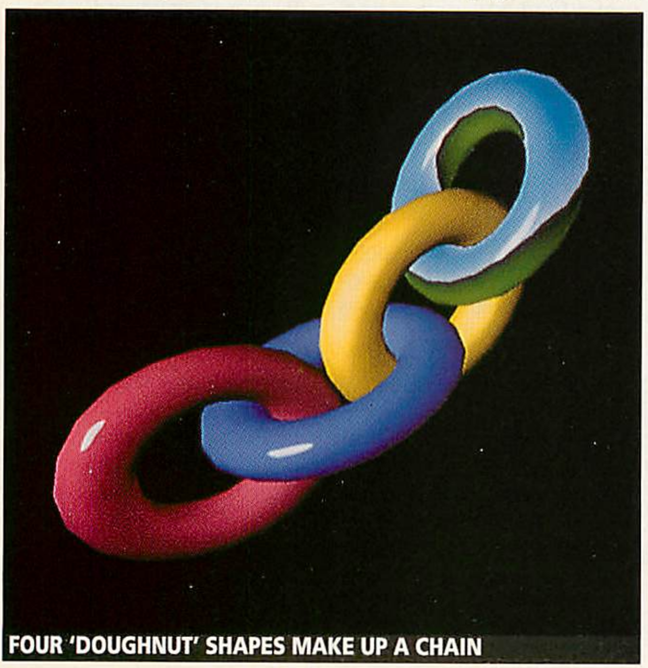
Of course, you are not just restricted to mapping images on to flat, rectangular surfaces – any shape constructed from polygons will do. Spheres, cones and toruses are provided, and these can be stretched and squashed to suit your requirements.

As well as being able to paint any screen on to a polygon or object, these can be any one of 16,777,216 colours. This is not just a random figure, but the number reached when you have 256 possible levels of red, green and blue – in other words, 24-bit colour.

At present the Archimedes range (including the new A5000) is unable to display more than 256 colours at once. To make use of the extra colours available, Clares has made *Illusionist* compatible with the Serial Port's Graphics Enhancer podule. This card provides pseudo 24-bit support, and therefore greatly increases the number of colours in the palette.

Pictures created on a machine fitted with the podule can produce scenes of photographic quality. Because of the vast range of colours available it is virtually impossible to see the joins between polygons, especially when the Smooth option is used.

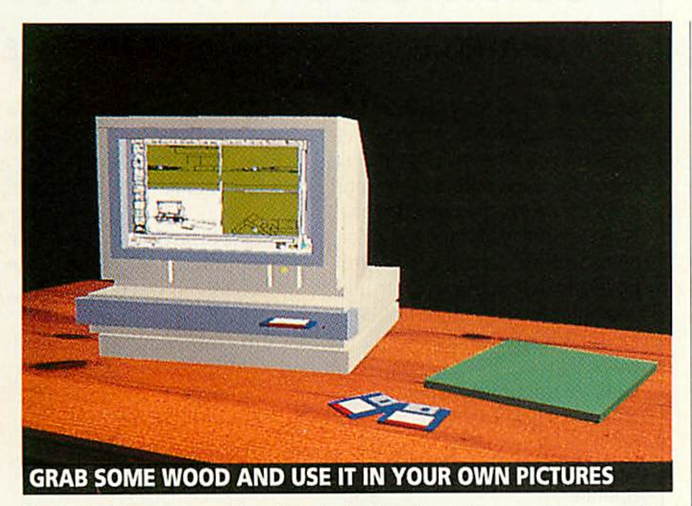
Colour for both polygons and objects is set by using slider bars (similar to those in *Draw*) to control the amounts of red, green and blue. For even greater control, red, green and blue levels can be typed in as values between 0 and 255.


FOUR 'DOUGHNUT' SHAPES MAKE UP A CHAIN

THE LIGHT TOUCH

Although *Illusionist* does not support shadows cast by one object on to another, it does allow light sources to be positioned to produce shading. Imagine two spheres, with one positioned between the other and the light source. You would expect a shadow to be cast on the sphere furthest from the light.

What *Illusionist* does is to shade each sphere as if both were in the path of the light. Although artificial, it does work surprisingly well in practise, and it is hard to notice that cast shadows are absent from a scene.


GRAB SOME WOOD AND USE IT IN YOUR OWN PICTURES

Up to 14 lamps can be placed within a scene, each consisting of a source position and a target position. They can be Points, whereby light will radiate in all directions, or Spots, where the light will travel in a fixed line. The colour of light can be any one of 16,777,216 colours and is set by using the red, green and blue sliders.

In reality, light travels in one direction and keeps on moving. However, it does appear to fade out after some distance, an effect which can be created in *Illusionist* by specifying the distance over which the light is to fade out. This is especially useful in situations with dark rooms and dim lighting.

One of the hardest aspects of using a 3D editor is being able to visualise the end product from flat 2D elevations. *Illusionist* provides a window whose sole purpose is to give an idea of what the finished picture will look like. Even though this program is far quicker than, for instance, *Render Bender 2*, it still makes sense to see the results before waiting an hour or so for the final picture to appear. To keep things at a sensible speed it only displays a wireframe outline, and only updates itself when requested.

Two other preview modes let you see how your design will turn out. A full screen, wireframe outline can be drawn to show the positions of objects in the finished scene, and a small Mode 13 version of the final picture can be plotted to allow you to check colours and lighting.

When you are happy with your composition, having checked the various preview modes for position and colour, the scene can be drawn. Any 256 (or eight-bit) colour mode can be used on a standard Archimedes. If you have the Graphics Enhancer fitted then *Illusionist* automatically works out the best 256 colours to use.

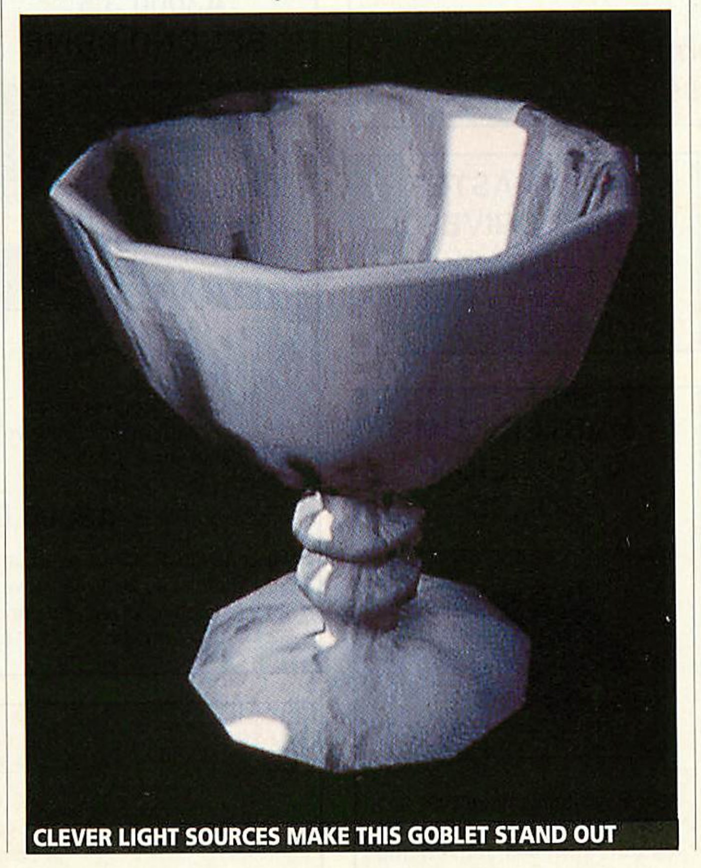
The time to render a picture depends on several factors. The higher the resolution, the more pixels there are to be plotted and hence a longer time is required. Anti-aliasing can be applied during rendering. This will smooth out any jagged lines by plotting intermediate coloured pixels between the offending gap, but does slow down the speed. Similarly the Closest-fit algorithm, used to select optimum shades for colour mixing, also delays the process.

Rendering can be set to use all of the computer's processor time. The image will be produced in a much shorter time, but you won't be able to multitask. Further reduce the time by switching the screen off. The unfinished picture can be inspected at any time, and rendering stopped, if needs be, by clicking on the mouse button .

If you want to use the computer while rendering, you open a window into which the picture is drawn. However, this is very slow and not very practical on an Arm2 machine.

Finished screens can be saved from *Illusionist* in one of three formats. Standard sprites allow screens to be easily transferred to other Archimedes packages such as *Paint* or *Revelation*, but these do take up quite a lot of space.

A new version of Clares' compressed screen file format can be used, greatly cutting down on the storage space needed. At present it is incompatible with Clares' *ProArtisan* although two conversion utilities are provided to change files from old to new specifications and vice versa. An eight-bit Tiff format allows pictures created in *Illusionist* to be transferred to other non-Acorn computers.


CLEVER LIGHT SOURCES MAKE THIS GOBLET STAND OUT

Full 24-bit colour screens can be created, even without the Graphics Enhancer. By selecting the 24-bit render mode, a file opens on a disc – preferably a hard disc, given the amount of space required. This is used to write data to, as the image is produced. As a typical 24-bit colour picture occupies well over 1Mb it is only really available to users with suitable on-line storage.

CONCLUSION

Given time (and a few careful readings of the manual) you can produce stunning results with *Illusionist*. Although it is quite difficult to get used to, it is also an extremely capable piece of software.

Designing 3D scenes in a 2D environment (the monitor screen) is always a task that requires thought. The methods used in *Illusionist* work well and compare favourably to other 3D editors.

One or two refinements would make it easier to use. Resizeable windows for the elevations would allow the extra screen area on high-resolution multiscan monitors to be utilised, and if only the selected object was shown, editing would be simpler.

At the moment though, *Illusionist* is by far the best art creation package available; much better in my opinion than its cousin *Render Bender 2*. If you wondered why you ever bought a Graphics Enhancer, then here's the reason. For around £300 (*Illusionist* + Graphics Enhancer) you can produce artwork of similar quality to professional graphics workstations. It seems insignificant when compared to the half a million quid for a Quantel Paintbox system.

PRODUCT DETAILS

- Product: Illusionist
- Supplier: Clares, 98 Middlewich Road, Northwich, Cheshire. Tel: (0606) 48511
- Price: £85 plus VAT
- Machines: Works with all Risc OS machines
- The Graphic Enhancer podule is available from Serial Port, tel: (0243) 531194

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Sparkle	£59
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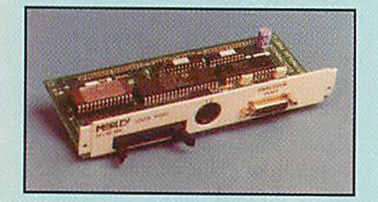
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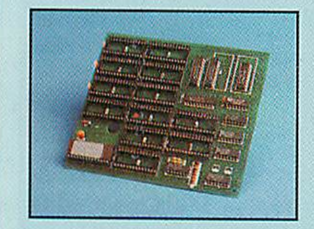
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SING SOMETHING SAMPLED

RICHARD GARRETT exercises his vocal chords and examines the new Karaoke craze

Among the many cultural imports to have taken root in recent years, few can be considered quite as curious as the Japanese phenomenon of Karaoke. For anyone who has not yet heard of the craze, Karaoke is a practice whereby a group of people get together, usually around a microphone and a large hi-fi, and take turns to sing along to instrumental versions of well-known songs.

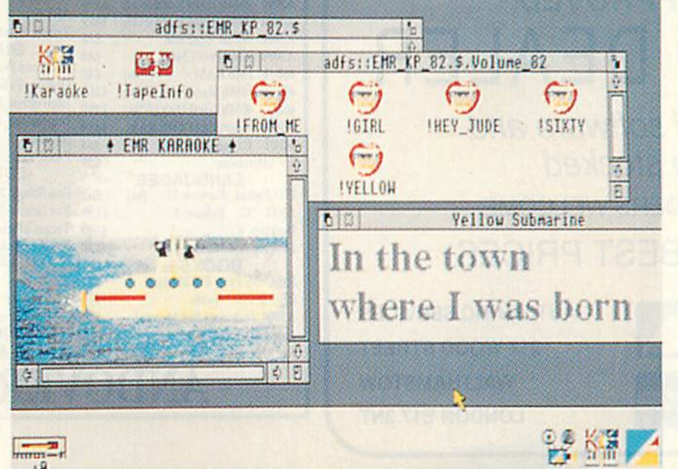
If you've ever tried this game, you will know that the hardest part, excluding the stagefright and ribald cheers of your audience, is remembering the words...

To deal with this problem, Electromusic Research have produced *Karaoke Performer*, a package consisting of an audio cassette and a BBC or Archimedes/A3000 disc. At present, EMR supports 90 volumes of music from the 1950s through to the early 1980s, with the emphasis on the kind of songs that tend to make good jeans' adverts.

SINGING ALONG

Karaoke is installed from the desktop by double-clicking on the icon. When you call up a song file, the first lyrics appear in big letters.You then select the Play option and a mouse icon with the word GO appears. At this point, if you're like me, you get up, rush around looking for the cassette player, find it, stick the cassette in, search for the right audio track and set the tape rolling just before the beginning of the tune. When the music starts, you finally click on the mouse.

In some songs, there follows a short pause, while the band plays the introduction and the computer waits for the lyrics to start. Once the music reaches the first verse, each successive word is highlighted in red, more or less in time to the music, and you sing along!



YELLOW SUBMARINE – JUST ONE OF THE KARAOKE CLASSICS

When the tune ends, your performance, no matter how bad, is met by an eight-bit sample of rapturous applause, whistles, and so on, from the internal speaker. This can be set to one of three durations or, if you have a modest nature, you can switch it off altogether. Dedicated egomaniacs, on the other hand, can get the full effect by producing the applause on a stereo, via the computer's headphone socket.

KEEPING IN STEP

As you may have guessed, a key factor in using *Karaoke Performer* is synchronisation. Since no cassette machine runs at exactly the right speed, EMR provides three timing options to help match the lyrics on screen to the music on your tape player. Re-time allows you to change the timing of the song by tapping a key, each time you sing a word during playback. This is a nice trick, but requires a fair level of musicianship to do it well. Adjust is easier to use and alters the running time of the whole song by between +99 and -99 seconds, moving all the words accordingly. The third, and my favourite, method uses the left and right arrow keys to 'nudge' the highlight back and forth as the tune plays.

Karaoke Performer has three display options: a small window showing about two lines; a full screen which displays five lines of big text and a video mode which superimposes the lyrics on to video with genlock. It also comes with a copy of Ace Computing's *Projector* which runs a short animation to go with one of the songs.

One confusing aspect of the program is its method of scrolling. As the song progresses, the highlight moves through the text and down the screen, with new text appearing above it, to replace the old. The average user would surely be more at ease with a conventional scrolling screen.

CONCLUSION

Karaoke Performer is a fun program with obvious uses for primary school music lessons. It may also be of some benefit for literacy studies. To appeal to a secondary school audience, however, it may need to provide some more contemporary titles (sing-along-a Guns 'n' Roses, perhaps).

Although the program looks simple, the timing options are sufficiently powerful to make it usable with most tape recorders. As for the music, it's typical library fare, clinically professional and serving up such standard fare as Beatles' classics.

But, there again, what do you expect for a mere tenner?

LOUDER THAN LIFE

To hear the backing track through something louder, you can use a special stereo lead. On one end of the lead, you need a 3.5 mm miniature stereo jack plug, which goes into the 32ohm headphone socket at the back of your computer. At the other end, you need connectors to suit your amplifier: ghetto-blasters often use another 3.5 mm stereo jack plug and most hi-fis use two phono plugs. The lead can be made up with a soldering iron, or bought from an electrical retailer. Once you get the lead, choose the best input on your amplifier. On a portable set-up, this is probably 'line in'. On a hi-fi, try the least sensitive input first (such as 'aux' or 'tape in'). Never connect the Arc to a record player input or to domestic microphone sockets and always work at low volume until you are sure that you are using the right socket.

PRODUCT DETAILS

Product: Karaoke Performer
Supplier: EMR Ltd, 14 Mounts Close, Wickford, Essex SS11 8HG.
Tel: (0702) 335747
Price: £10.00 plus £1.50 p&p
Machines: BBC, Arc/A3000


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Minerva are probably the largest supplier of software for the Archimedes and A3000 computers. Minerva have built a reputation for software which is professionally written for power and versatility whilst achieving total user friendliness. Much acclaim has been received for their software including the 1989/1990 AU Award for the Best Art Package with Atelier.
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This full art package exploits the 256 colour capabilities of the Archimedes allowing stunning graphics to be created easily and professionally. Sequences of these may be animated to produce amazing effects. Winner of the 1990 BAU award for Best 32 bit Art Package.
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A colour scanner can be a bright addition to your computer's repertoire. **GRAHAM BELL** helps you to make the right choice

PHOTOGRAPHS BY PAUL VENNING

IMPROVE YOUR IMAGE

It was 16 months ago when Irlam Instruments launched the first colour scanner for the Archimedes. Now the original Irlam Image has been joined by several similar full-colour scanners ranging from £549 to £1799. The one you choose could have a lasting effect on your computer images, so we tested a selection of the latest models.

We looked at four scanners in total: the Image's big brother, Pro Image, plus models from Iota, DT Software and Beebug. All of these scanners combine scanner mechanisms made in the Far East, by the likes of Sharp and Epson, with an interface podule and Archimedes software.

Colour scanners work in fundamentally the same way as monochrome scanners (see the review in *BAU* October issue). A series of mirrors or lenses focus an image of the object on a strip of light-sensitive CCD sensors – the brightness of the image is read from the strip and sent to the computer. This becomes one row of the sprite, as each sensor on the strip corresponds to one pixel. The strip is then moved along, so that it can read in the next row.

The differences between models arise because the colour scanners have three different coloured lights to illuminate the object. So for each row, there is separate red, green and blue brightness data, and each of them measures up to 256 levels of each colour.

The first Archimedes colour scanner, Irlam's Image, uses a white light and three coloured filters selected in turn. It took three separate scanning passes to build-up the full sprite (this is known as page-mode). Some of these new scanners, such as those based on Epson and Sharp JX-300 units, can quickly switch colours as they scan, so only a single pass is necessary (line mode). At the computer end, the separate data for red, green and blue is combined into a single sprite.

There is one big headache with colour scanning – size. An A4-size monochrome scan at, say, 300dpi (dots per inch) totals almost eight million pixels. But, as each pixel can be either black or white, that is only one bit per pixel, or 1Mb.

Equivalent sized grey-scale scans could be either 4Mb with 16 shades of grey (four bits per pixel), or 8Mb when you use a scanner with 256 grey levels (eight bits per pixel). The colour images that these scanners produce can be up to eight bits per pixel per colour channel – a whopping 24Mb per A4 page. So how many colours can the scanners see? Well, just over 16 million – yet, surprisingly, there are still some colours that the human eye can see, but these scanners cannot.

TRUE COLOURS

These scanners generate 'sprite' data with up to 24 bits per pixel of colour information – 16 million colours. But Risc OS can only deal with sprites with a much smaller number of colours, either 16 chosen from 4096 shades, or a fixed set of 256 colours. So how do you create a sprite that contains fewer colours, while retaining as much of the original look as possible?

The answer is dithering – mixing together pixels of different colour to mimic the real colour. Dithering is familiar – a chessboard pattern of red and yellow makes orange. There is a better technique called error diffusion: you pick the nearest

colour for a pixel, and decide just how 'wrong' the colour is, then you correct for the mistake by adding colour to some of the surrounding pixels. It is easy to imagine in black and white: a dark grey area would be mostly black (the nearest colour) but with a few white pixels dotted around to correct for the black being 'too black'.

The *ChangeFSI* application and the routines in the current crop of scanner software use a particular algorithm (Floyd Steinberg Integer) for spreading the corrections irregularly around the original pixel. It tries to correct the colours while avoiding the obvious patterning effects that 'regular' error spreading would create in areas of solid colour.

ChangeFSI also contains separate processing stages for colour correcting and sharpening the image, which can improve the look of scans. The full application can also read many foreign file formats and convert them to sprites in a chosen screen mode. One important format is Clear — the 24-bit standard used to store the data read from disc by many of these scanners. The scanner software uses *ChangeFSI* to mix this down into a usable sprite.

The public domain program, *Translator*, does much the same job as *ChangeFSI*, and probably just as well. It can, in some circumstances, be more flexible, but my preference is for *ChangeFSI*.

Getting 24Mb of data from the scanner to the computer takes time – that is why they all use special fast interfaces like the two-way parallel port or IEEE podules. And they cannot store the full image in memory, so as soon as the data arrives at the computer, it has to be put on hard disc. If you haven't got a large, fast hard disc, 4Mb or more of Ram, plus a bulging wallet, colour probably isn't for you.

GET THE BEST SCAN

With all of scanners, there are ways to optimise the results you get – the ideal scan has clarity, good contrast and 'true' colours. Getting the best scan is usually a compromise between these objectives, and depends on what you want the image for. If you match a sprite as close as possible to the original then whack up the contrast on the monitor, it changes colour. The best-looking sprite on screen will probably not give the best-looking print out. Screens and printers have differing colour balances. In the professional printing world, even the paper you use is important.

With the limited display capability of the Archimedes, you cannot see the full detail available from any of these scanners. But any difference between them is tiny, compared with the contrasts you can create by how well you set up *ChangeFSI*. There is certainly a degree of skill involved: try experimenting to find the best software settings for your own needs.

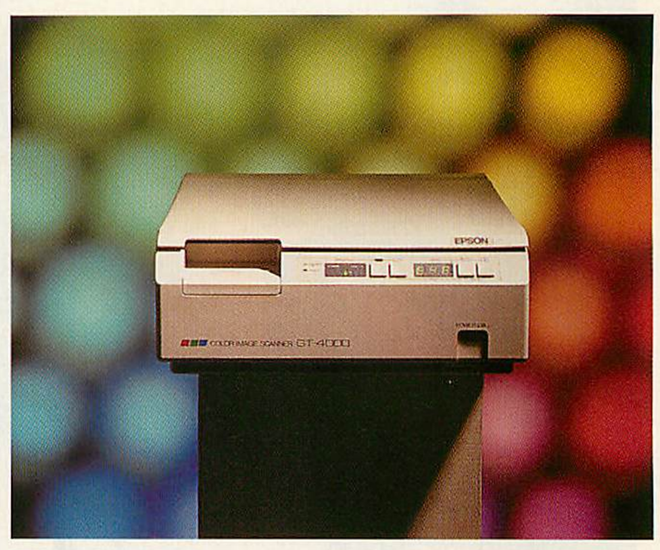
There are, however, a few general hints. Unless you plan to blow-up the sprite much bigger than the original, do not scan at more resolution than you can print. High resolutions just take longer and create impossible 10Mb files.

Do try out a range of gamma-correction values. The gamma curve links the brightness of the object with the brightness of the final image. You would think a straight conversion would be best, but the human eye cannot as easily distinguish between black and dark grey as it can between white and pale grey.

So gamma correction artificially lightens dark and mid-tone colours, thus increasing the apparent contrast. Too much correction and you lose detail in the brightly-lit parts of the picture.

And try pre-sharpening if this is an option. This image-processing technique emphasises the 'edges' in the image. A little sharpening definitely improves the look of most scans, but too much gives the image a cartoon quality with obvious outlines.

Having said that, take a look at our product boxes to see the merits of each individual scanner. We looked at four scanners in detail, but bear in mind that there are more coming on to the market all the time. A case in point is a new colour scanner from Clares, priced at £1799. The software is in the final stages and will be available in the New year.



DT SCAN

Suppliers: DT Software
Tel: (0223) 841099
Price: £1299 with 400dpi, £1699 with 600dpi

DT Software has based its model on the Epson GT4000 scanner, incorporating its own design of podule providing a bi-directional parallel port. The software is on disc, along with the latest versions of *Translator* and *ChangeFSI*.

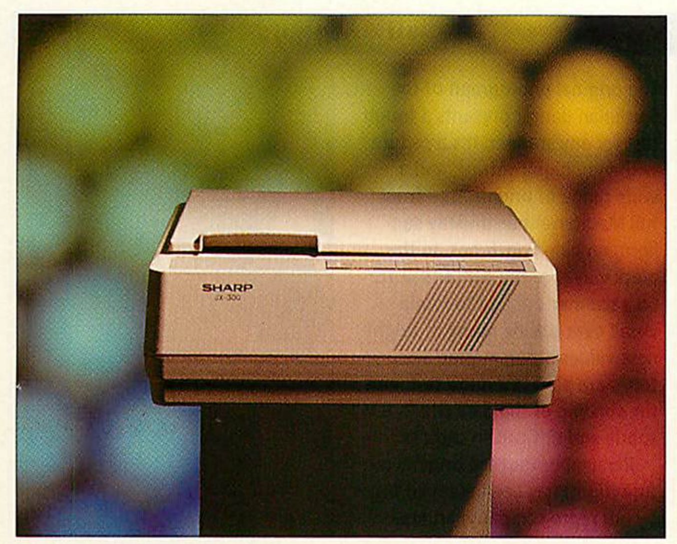
The Epson is a 24-bit, 300dpi scanner with a measure of intelligence built in. It can be made to do a number of gamma and colour correction functions, and a certain amount of dithering of colours when you set it for fewer than 24-bits. The correction facilities are fixed, not variable, and are set-up to give the best reproduction on monitors and low-quality colour printers, like dot-matrix machines with colour ribbons.

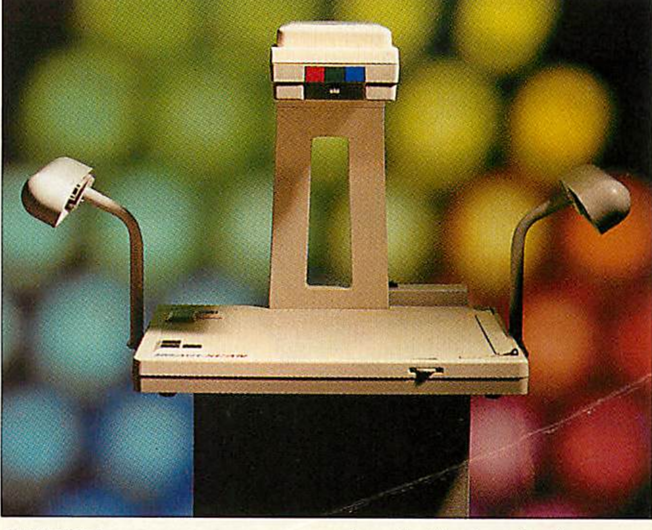
One of the more bizarre features of the scanner itself is that by connecting it directly to an Epson colour dot-matrix printer, you can use it as a slow colour photocopier. Setting up the software is easy, despite the skimpiest of manuals. All the settings are done via one dialogue box, with buttons for the scanner's various gamma and colour correction options. A generic but informative Epson manual describes significance of these features: one unusual idea is the selectable drop-out colour for grey-scale scans (if you use coloured light to scan, then the opposite colour will appear black, so green light makes any magenta in the object look black). But the dialogue isn't perfect – for example, the dropout colour is only relevant for grey scale scans, so it should be greyed out when colour scanning is chosen.


A TOP OF THE RANGE SCAN

Pressing Go presents a standard Save box, and a Clear file icon to drag to a hard disc. Scanning a postcard-sized photo takes only four or five minutes, the machine remains multi-tasking, and the scan can usually be paused. A minor bug in the software meant that the pause controls did not always appear, but this should be fixed.

Scans are always saved as Clear files – 3Mb or so for a postcard-sized scan. They retain the full 24-bit colour data, but it means that creating a sprite is always a two-stage process. *Translator* and *ChangeFSI* both accept Clear files and convert them to sprites. However, getting to grips with these complex utilities would not be necessary if they were better integrated and sensible defaults provided – as they are with the Pro Image scanner, for example.





PRO IMAGE

Suppliers: Irlam
Tel: (0895) 811401
Price: £1659

Irlam uses the Sharp JX300 scanner in the Pro Image. It is a flatbed design with a removable cover over the glass (so you can scan thick objects like book pages by taking it off). It is a slightly neater design than the DT Scan model, but is less intelligent – the scanner itself does no image processing or colour correction.

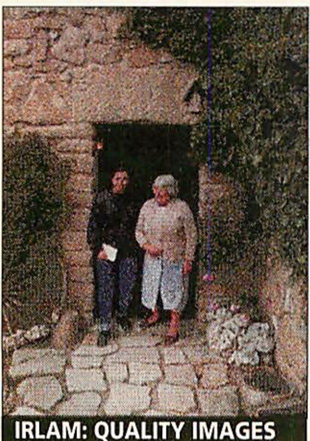
An IEEE podule is included and a good-quality cable links it to the scanner. Software installation consists of copying a single application from floppy to your hard disc. The Irlam manual is sketchy, but the application works exactly as you would expect. It is a development of Irlam's original *Image* software, but now caters for higher resolutions and includes a greater image processing element. A click on the icon opens a control window ready to do a pre-scan.

Pre-scanning always scans the whole page, but it is remarkably quick and the scan builds up on screen. It can be stopped at any time and the machine remains usable.

You can also choose full colour or grey scale, and set the colour depth (18 or 24-bit colour) and scan resolution this way: anything from 50 to 300dpi. Pro Image also incorporates the key features of the *ChangeFSI* program: it is not a separate package. Although the defaults are sensible, you can select a level of gamma correction, a certain amount of pre-sharpening and so on, as well as choose the format of the final output. It supports Clear, TIFF and JPEG files, as well as sprites.

Pressing the Scan button starts it off: scanning a postcard-sized image, at 200dpi or more, takes several minutes, but you can do other things. Pro Image also carries out FSI-based dithering and displays the sprite on screen as it goes along. Because of this, it needs a vast amount of memory: 4Mb is enough to scan your holiday snaps, but anything much bigger is out of the question. You cannot turn the preview display off to conserve memory and just scan to disc – definitely a drawback.

On the plus side, the quality of the scans is impressive. The Irlam software is reliable, easy to use, but really needs lots of memory. The DT scanner can get away with fewer megabytes, but is less integrated: *ChangeFSI* is a separate application with a complicated menu structure, and it is less approachable than the 'simplified' version built in to the Irlam software.


IRLAM: QUALITY IMAGES

IMAGE

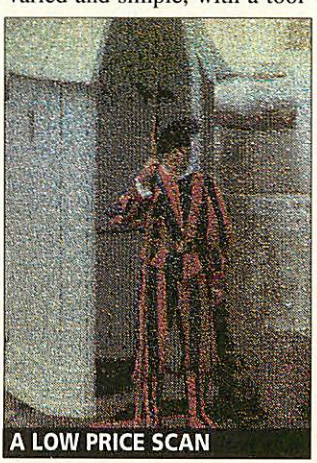
Suppliers: Iota
Tel: (0223) 421542
Price: £597 upwards depending on 'extras'

This is definitely the most unusual looking scanner. The Chinon mechanism looks interesting, but close up it has that slightly low-cost plastic look. Certainly, the quality of construction is not as good as the other units in this review.

Also, while all of the other scanners are fully-motorised, the Iota model differs in that you have to change the filter colours manually during the scanning process.

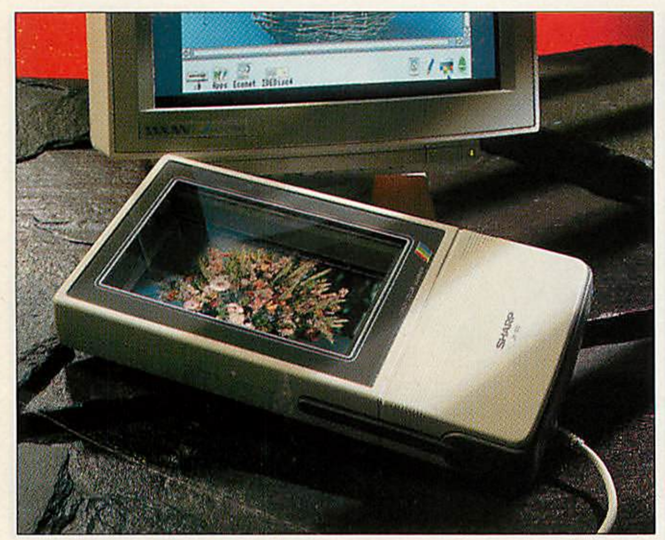
Setting up the scanner and the well-built podule is straightforward, but fixing the lights is not. Giant blobs of Blu-tak finally did it, as there isn't any fixing point on the scanner itself: the lights seem to have been an afterthought. The Chinon senses the ambient light only at switch-on, so make sure all the lights are on before powering up.

The scanner software is varied and simple, with a toolbox duplicating the few menu options. It starts up ready for a pre-scan, which builds up in the main window – then you change to colour scanning, choose a resolution and Go. But the resolution is limited to 75dpi in colour – all of the other scanners go up to 200dpi or more. The software reminds you to set the red filter, then builds up the red image. After a filter change, this is overlaid by the green image, and finally the blue. In all, five minutes or so is needed at maximum resolution, to scan in a postcard-sized snapshot.


A LOW PRICE SCAN

But even after considerable experimentation, the quality of images from the Chinon was disappointing when compared to the other scanners – even allowing for their lower resolution. And the software does not give you any more advanced options, like gamma correction and so on.

The design of the Chinon gives it one unique advantage – you can scan objects with depth. The optics in the scanner head keep items up to about half-an-inch thick in reasonable focus. But the drawback is that, as neither the scanning head or lights move, there is significant distortion of the image towards the edge of the area. The light quality varies noticeably across even a small picture and, as it scans, the head vibrates slightly on its arm. This could be the cause of some pattering on scans – it sometimes looked as if scans had been taken from magazines, giving a rosette moire pattern, when in fact the originals were continuous tone photographs.



SPECTRA

Suppliers: Beebug
Tel: (0727) 40303
Price: £549

Beebug's Spectra model is based on the Sharp JX-100 A5-sized scanner used with the original Irlam Image. Because of this, it lacks some of the flexibility of the other units in the review. It scans in page mode, and takes about 12 minutes to produce a postcard-sized scan at 200dpi – surprisingly, it is comparable in speed to the Sharp and Epson A4 scanners, despite using a serial, rather than a parallel, interface.

Setting up is similar to the other units – you fit a podule and plug it all together. This is explained well in the manual – the early draft available for the review was the best of the bunch by far. The software is also commendably simple and much of the complication of *ChangeFSI* is hidden – all you have to do is choose the area of the scan and click.

The monochrome pre-scan is disappointing. It is not amazingly fast, it doesn't show the sprite on screen as it goes along, and when it finally does appear, it displays in a muddy grey shade with relatively poor detail. The threshold between white and mud is wrong for most subjects, so it is difficult to set the real scan area accurately. But once this is done, scanning can proceed.



LOW PRICE – HIGH QUALITY

Again the software does not build up the image on screen, but it does gradually fill the window with red, green and blue on subsequent passes. It gives a good indication of how far it still has to go, and you can still use the machine for something else. After scanning and a pause for *ChangeFSI* to dither the 24-bit data down to a sprite, the image is displayed. The quality is remarkably good – and compares well with the bigger scanners.

You can use the Process dialogue to change the *ChangeFSI* parameters if you want particular results. But, significantly, the default gamma correction setting is quite different from the other scanners, so the first image a beginner sees will immediately look better on screen.

Toning down the gamma correction can give better results, if rather less impressive on-screen. There will be less contrast, which always looks effective, but the colours will be truer to the original.

Beebug is probably a good option for those with a lower budget who don't mind not having full A4 capacity. In fact it is comparable to the original Irlam Image scanner, which is now priced at £599 with the new software of Pro Image.

THE LINE UP

The original photograph of the Sardinian dancer presents a tough test for any scanner. It's a picture with very high contrast, and a wide range of brightness – from full Mediterranean midday sunlight, on pale flagstones, to the black velvet of the dancer's skirt. So a scanner's ability to retain detail over a wide range of brightness values is paramount. Skin tones are always a good test, and the shading of the dancer's face is subtle and difficult to capture.

Remember that the original picture (right) has been scanned too – by our repro company, Trumps.

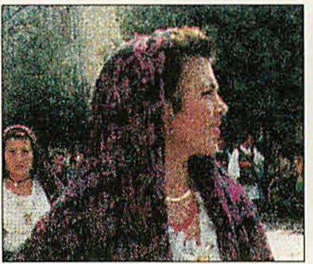




Spectra: *scanned with lowered gamma correction. Still too much contrast, but impressive*



Image: *poor as the colour balance varies across the picture, plus low resolution*



Pro Image: *paler on-screen than DT's, but more due to ChangeFSI than the hardware*



DT Scan: *used the intelligence of the scanner (mode B) – just not enough gamma correction*

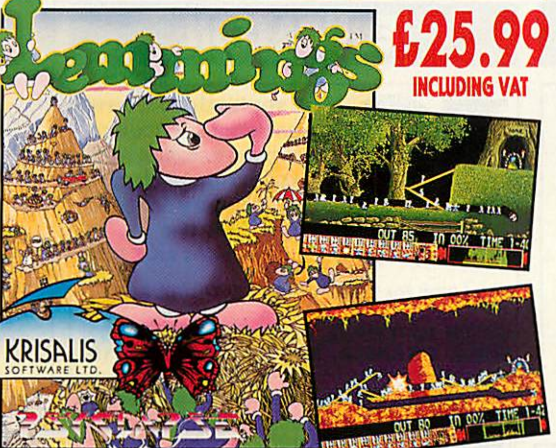
CONCLUSION

The full-size A4 scanners from Irlam and DT vary little in their capabilities and are also more or less the same price. While the DT Scan model nominally does more of its own gamma correction and so on, you can often get better-looking results by ignoring all the printer's intelligence and using ChangeFSI afterwards. The more integrated Irlam software, that comes with Pro Image, is a little easier to get to grips with, but requires more memory for the same sized scan. For anything more than postcard size scans at 200dpi, you will need an upgrade to 8Mb.

In the lower price bracket, the choice is more stark: the extra flexibility of Iota's Image, which can scan in A4 images, or the quality of the Beebug Spectra, as shown in our results. Assess carefully just how important A4 size and the ability to scan solids is, and make sure you see the Iota product in action, before committing yourself.

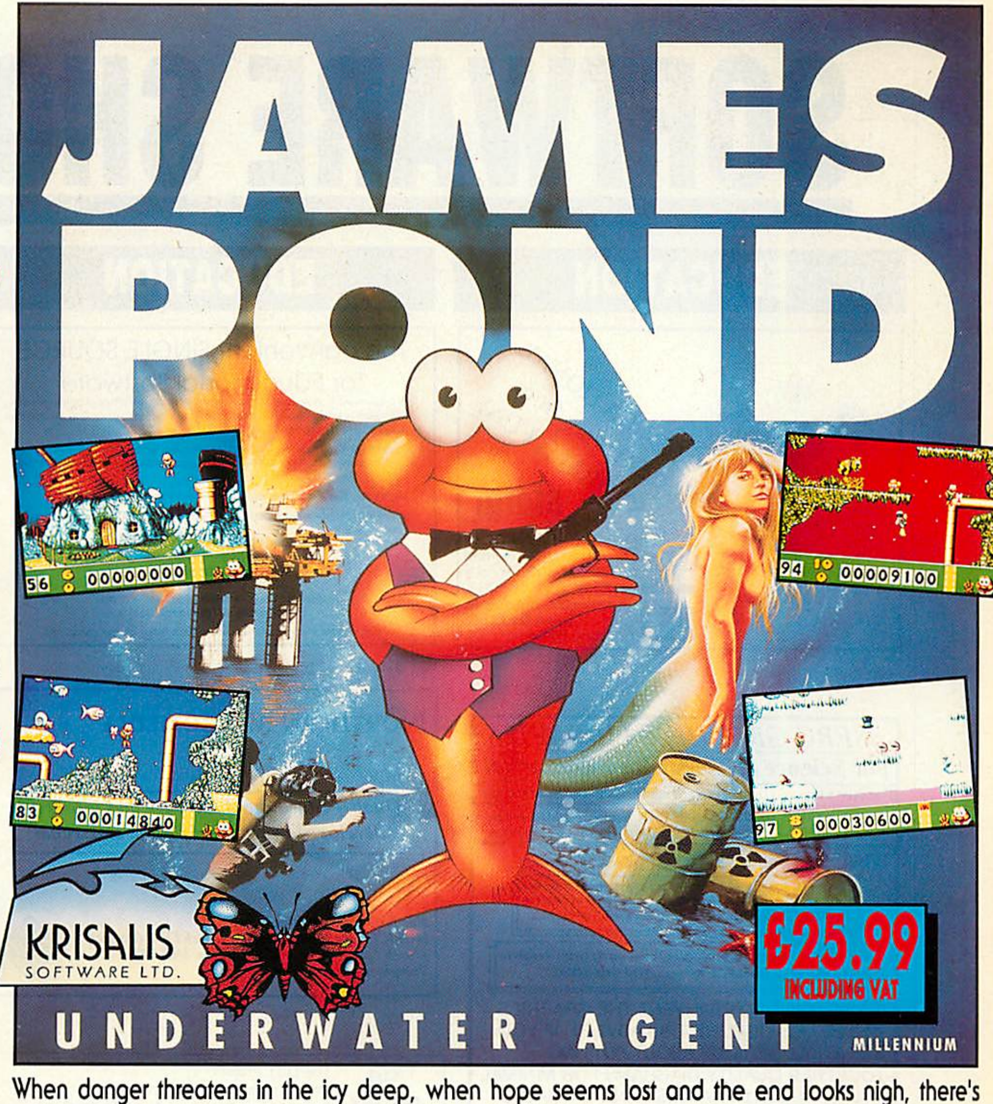
Whichever you are interested in, remember that colour is difficult and expensive to print out properly, so your work may be confined to the screen. (For an overview of colour printers see our review in BAU, July 90.) And, remember also that, as with the argument which raged over the conversion of the movie Citizen Kane, poor colour can sometimes be worse than no colour at all.











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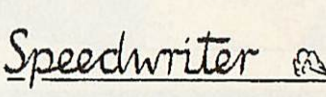
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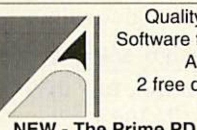
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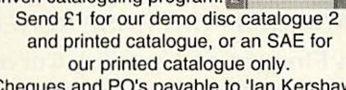
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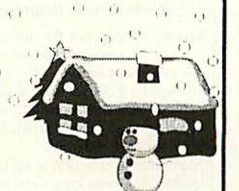
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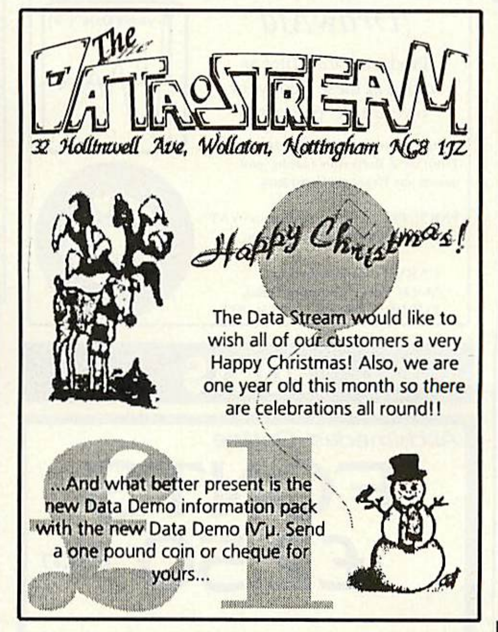


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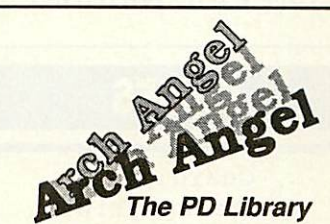
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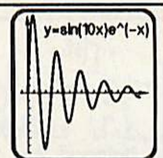
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ACORN USER ADVERTISEMENT PAGES – JANUARY 1992

£25 Prize - Jugglery!

This month's prize puzzle is deceptive simply; take the 12 signs of zodiac (they are listed below) and arrange them Scrabble-like on a board so that the size of this board is minimized. All words must be written from left to right or from top to bottom. No word may be isolated - it must share at least one letter with another word. No two letters may be adjacent horizontally or vertically, unless they are consecutive letters in one of the words to be fitted on the grid. And hence, no other words are permitted.

As an example, the 12 months will fit on to the 9x13 board shown below (an area of 117 squares). The 12 signs are: Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, Sagittarius, Capricorn, Aquarius and Pisces. To give you a start, you should aim for a board with less than 150 squares. The sender of the solution with the smallest board will win the prize of £25.

		M	A	Y				
		A				N		J
A	P	R	I	L		O		A
U		C				V		N
G		H				E		U
U				D		M		A
S	E	P	T	E	M	B	E	R
T				C		E		Y
	J	U	N	E		R		
				M				J
O	C	T	O	B	E	R		U
				E				L
	F	E	B	R	U	A	R	Y

Please send your entries on a postcard to *BBC Acorn User*, 20-26 Brunswick Place, London, N1 6DJ to reach us by Friday January 17 1992. The solution (and the winner) will be published in the March issue.

Crossnumber

B H Davies of Leeds earns himself £20 for this crossnumber puzzle. He actually sent in five, so you may well see the others at some point in the future!

In this puzzle, only the digits zero, one, four and eight are used and no number has any leading zeros or occurs more than once in the grid. Can you deduce the solution? If not, check out next month's puzzle page, where we will reveal all!

1	2	3		4	■	5
■	6		■	7		
8		■	9		■	
	■	■		■	■	
	■	10		■	11	
12			■	13		■
	■	14				

Across
- **1** Square
- **6** Square root of 11d
- **7** Square
- **8** 10d-11d
- **9** Square
- **10** 12a/8a
- **11** 2d-7a
- **12** Square
- **13** 7a/6a
- **14** Square

Down
- **2** 7a+11a
- **3** 2x13a
- **4** Square
- **5** Square
- **8** Square
- **9** Square
- **10** Square
- **11** Square
- **13** Prime

Leeming!

NOTICE: Due to an unforeseen spelling mistake, this month's one line game is called *Leeming*. We would like to take this opportunity to point out that no similarity was intended to be drawn between this and any other games currently on the market. Future copies of the game will be made available under its correct name of *Sachet*. We hope this does interfere with your pleasure of the game.

Leeming features over 300 levels complete with 200K of stunning graphics and 27 highly atmospheric pieces of background music or at least it did on the drawing board. Of course, during the production phase of the game, many of these features have had to be trimmed and pruned, but we feel that the final game (shown below) is a far more streamlined product than we first envisaged. The idea of the game is to help the Leeming reach the top of the screen. Left alone, he will walk left and right and fall off any surface. Three keys are provided to change the Leeming's task. 'B' will start him building a bridge. He will stop when 'B' is released or he hits the underside of an existing block. You can make him dig downwards, through blocks he has placed when building, by pressing 'D'.

Similarly, pressing 'M' will tell the Leeming to mine sideways through blocks. Note that it not possible to dig either way through the solid white blocks.

To enter the listing, first type in the function key definition shown below then carefully enter the *Leeming* game. Do NOT enter any spaces after the line numbers. To squash the program onto one line simply press F0. The resulting single line can be saved in the usual way.

```
10 MODE7
20 D=TRUE
30 y=40
40 REPEATVDUD
50 UNTILVPOS=24
60 VDU284;22,294;12
70 FORW=0TO94
80 ?(HIMEM+RND(920))=D
90 NEXT
100 X=HIMEM+W
110 o=X
120 REPEAT
130 REPEAT
140 ?o=0
150 ?X=38
160 T=INSTR(" DBM",INKEY
    $9)
170 o=X
180 a=-y*(X?y<33)
190 a=a-y*(T=2)*(X?y=W)*
    NOTSGNa
200 X=X+a
210 UNTILa=0
220 a=-D*(X?D<33)
230 a=a-D*(T=4)*(X?D=W)*
    NOTSGNa
240 X=X+a
250 D=D*((a=0)*2+1)
260 IFX?-y<33ANDT=3 X=W:
    X=X-y:UNTIL0ELSEUNTI
    LX<&7C50
```

```
*KEY0 f=PA.+4:t=f:b=&F5:REP.c=(b<>&F5):?t=-?t*NOTc-58*
c:t=t-c:x=f?-1:FOR i=1TOx-4:b=?f:?t=b:f=f+1:t=t+1:N.:f
=f+4:U.f?-3=&FF:?t=&D:t?1=&FF:?(PA.+3)=t-PA.|M
```

Solution to December's Pathword puzzle

There were 47 words in total, including the 13 letter word configuration. The other possible words were: agonic, anion, anon, anti, antic, artic, aunt, coin, conation, conga, congo, contra, cooing, font, gain, gait, gaunt, gaur, gnat, goon, guano, icon, info, nation, noon, octagon, onion, ragi, rain, rang, rant, rating, ratio, ration, rung, runic, runt, tang, tango, ting, tragi, train, trug, union, unit, uranic.

Solution to November's Six-pack puzzle

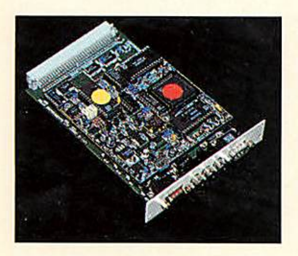
The 20 hidden words were all Basic keywords and all of them started with different letters of the alphabet: ADVAL, BGET, COLOUR, DELETE, ENVELOPE, FALSE, GOSUB, HIMEM, INPUT, LOCAL, MODE, NEXT, OPENOUT, POINT, RENUMBER, SOUND, TRACE, UNTIL, VPOS and WIDTH.

There were 15 unused letters that spelt out OPERATING SYSTEM. The first correct solution out of the proverbial hat came from Geoff Morley of Cannock, Staffs, who wins £25.

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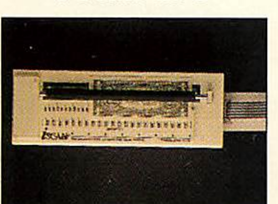


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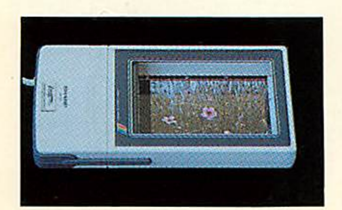


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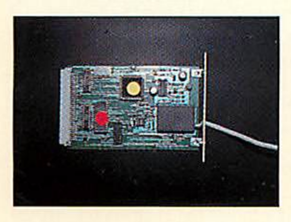
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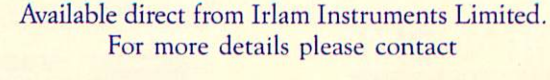
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